

**Levels of acceptance and perceived control in a chronic
pain population: a preliminary study**

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ABSTRACT

Levels of Acceptance and Perceived Control in a Chronic Pain Population: A preliminary study

Donna J Gilroy

Introduction: Clinical observation suggests that patients who accept a degree of pain appear to be better placed to work at strategies to minimise their pain and its disabling consequences. Some chronic pain patients appear to possess a greater willingness to be more active and experience a potential increase in pain due to a belief that they can exert some control over it when it occurs. Positive effects can be derived from greater perceived control over pain, 'the kind of control that can be acquired first requires an acceptance of having pain' (Arntz and Schmidt, 1989). There is a growing evidence base for acceptance and control based interventions for chronic pain. Furthermore, both higher levels of acceptance and perceived control have been consistently associated with better physical and psychological functioning and overall adjustment to pain. Yet, given this, the relationship between pain acceptance and perceived control over pain has not yet been investigated explicitly. The main aim was to conduct a pilot study to examine such a relationship.

Method: A cross-sectional survey design was adopted. Thirty six patients referred to a Pain Psychology service and who met basic exclusion criteria agreed to participate. Participation involved giving consent from data contained in routinely administered questionnaires: the Chronic Pain Acceptance Questionnaire (McCracken, 2004), the Pain Control Scale from the Survey Of Pain Attitudes (Jensen & Karoly, 2007) and three Perceived Control Likert-type Response Scale items (Jensen et al, 1991) . Basic demographic and pain related questions were also included.

Results: Results of Pearson's product moment correlations found significant moderate associations between perceived control, pain willingness and total acceptance scores. However, there was no significant relationship between perceived control and activity engagement. There were differences in significant findings for the Pain Control scale of the SOPA compared with the Perceived Control Likert-type Response Scale items; the latter being non-significantly correlated with acceptance measures.

Discussion: These data suggest that perceived control and pain acceptance may co-exist and that changes in one construct may facilitate changes in the other. This may have important implications for theory and clinical practice, in particular, in providing some explanation for therapeutic outcomes. Limitations and future areas for investigation are also discussed.

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1. Questionnaires and Measures utilised in the present research:
 - Revised Chronic Pain Acceptance Questionnaire (CPAQ)
 - Pain Control subscale from the Survey of Pain Attitudes (PCS-SOPA)
 - Perception of Control Likert Scale Questions
 - Participant demographic and pain characteristics questionnaire
2. Participant Information Sheet and Consent Form
3. Letter of Approval from Local Research Ethics Committee
Letter of Approval from Local Research and Development Office

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CHAPTER ONE: INTRODUCTION

1.1 Format of Thesis

The thesis presents the results of preliminary research into the relationship between levels of acceptance and perceived control in a chronic pain population. To aid in the structured reading of the research a brief outline of the constituent chapters of the thesis will be given below.

The current chapter (Chapter 1) aims to introduce the reader to the concept and definition of chronic pain and its prevalence and impact, both in relation to individual persons and society as a whole. In Chapter Two, the reader will be introduced to the predominant theories and models of pain, and specifically, chronic pain. The first two chapters intend to give the reader a comprehensive background to the nature of chronic pain, pivotal developments in conceptualisations of pain and the importance of study in this area. In Chapter Three, the influential concept of coping within chronic pain is introduced. Control based approaches and their empirical and clinical basis is evaluated and the psychological construct of perceived control and its relationship with chronic pain is discussed. In Chapter Four, the psychological construct of acceptance is defined and its theoretical underpinnings and clinical application in relation to chronic pain are also

highlighted. Furthermore, the rationale for the present research is further underlined and the proposed hypotheses are given. Chapter Five documents the research methodology. Chapter Six explores the results of the statistical analyses carried out to test the research hypotheses and does this by looking at each hypothesis in turn. Discussion of the research findings and a critical analysis of the methodology in Chapter Seven are followed by the theoretical and clinical implications. Areas that require clarification and investigation are suggested.

1.2 Chronic Pain: Definitions, prevalence and impact

1.21 Definitions and Classification of Pain and Chronic Pain

Pain is one of the most common reasons for seeking medical attention (Schappert, 1989; Gureje, Von Korff, Gregory & Gater, 1998; Hadjistravopoulous & Craig, 2004). It has been estimated that approximately 80 % of medical outpatient appointments include a consultative component for pain (Henry, 1999 - 2000).

Pain has been defined in a number of different ways. The most common reference for a definition of pain is that of the International Association for the Study of Pain (IASP) (Merskey, 1979). According to this, pain is:

'An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage or both'. (p.249)

The above definition emphasised the subjective and psychological nature of pain and avoided making the authenticity of pain contingent on an externally verifiable stimulus (Thienhaus & Cole, 2003). Furthermore, this definition of pain highlighted that the experience of pain required individuals to seek relief from it. However, this definition has, by no means, been universally adopted and has been the subject of debate and critique within the pain literature. The initial IASP definition was criticised due to the explicit reference to tissue damage association (Anand & Crain, 1996) and the concept that pain could be *described*, as such (Hadjistavropoulos & Craig, 2004). Price (1999) proposed that the original definition be updated so that there was no requirement to objectively demonstrate either actual or potential tissue damage, or an association between sensation and tissue damage, as this would be difficult to demonstrate in many clinical cases.

With this argument in mind, Price (1999) defined pain as:

'a somatic perception containing a bodily sensation with qualities like those reported during tissue-damaging stimulation, an experienced threat associated with this sensation, and a feeling of unpleasantness or other negative emotion based on this experienced threat'(p.4)

That pain could be 'described', and therefore, the original IASP definition could read that such a description may be required, is a further point of criticism. If taken as such, there would be a reduced probability that non-verbal individuals (e.g., babies/young infants, adults with cognitive or intellectual impairments) would meet such a criterion for pain. Thus, the IASP added the following note to its definition in 2001:

'The inability to communicate in no way negates the possibility that an individual is experiencing pain and is in need of appropriated pain relieving treatment'

This raises the question as to whether the standard definitions of pain satisfactorily capture the key features of pain. Sullivan (2008) argued that despite an acknowledged relationship between pain and behaviour pain continues to be defined as a sensory and/or experiential phenomenon, with the role of behaviour negated. In addition, the role of cognition in pain is not adequately represented within a standard definition.

Melzack and Casey (1968) stated that pain is a multidimensional experience comprised of a complex interaction between sensory, affective and cognitive features within the central nervous system. Individual appraisals of the meaning and implications of sensations and symptoms of pain, memory, attention, and learning are also important (Turk, 1996). The absence of an

explicit reference to cognitive or behavioural mechanisms in a definition of pain has not inhibited the growth and contribution of cognitive or behavioural conceptualisations or interventions in pain (Norton, Asmundson, Norton, & Crain, 1999). However, it has been suggested that the psychometric reliability and validity of the IASP definition of pain requires further investigation and clarification (Turk & Okifuji, 2002).

What is clear is that the more simplistic the definition, and classification, of pain is, the more omissions and overlaps that occur (Pasero, Paice, & McCaffery, 1999). Thus, a broader classification system of pain is often used. Conventionally pain is classified according to location of the pain, underlying cause, onset, frequency, duration and impact.

Classification of an individual's pain by body *location* can relate to the specific anatomical site of pain (e.g., lower back, head, leg, or pelvis), or by the classical body systems (e.g., musculoskeletal, neurological or vascular pain). To some extent these two systems overlap and only address where or why an individual is in pain. Sole classification of pain by location may fail to adequately define the underlying neurophysiology of an individual's pain (Turk & Okifuji, 2002). Also, in the case of chronic pain, there can be multiple sites of pain.

Perhaps the most common, and obvious way of distinguishing pain syndromes is by their *duration*. This distinction was thought to be important in facilitating the understanding of the neurophysiology of pain (Crue, 1983). Three main types of pain duration are consistently identified: acute, chronic and phasic. However, a further time course – subacute pain – has also been identified (Thienhaus & Cole, 2003).

Acute pain is a limited period of pain lasting no longer than 30 days. Chronic pain has been defined as ‘pain or discomfort that has persisted continually or intermittently for longer than three months’ (Elliot, Smith & Penny, 1999, p.1248), although most definitions state that pain must be persistent over six months and extend over what is regarded as ‘normal’ healing time (Bonica, 1985; IASP, 1986). Subacute pain is the interval between defined acute and chronic pain, that is, the end of month one and the beginning of the seventh month of persistent pain. Phasic pain (also referred to as recurrent acute pain), is a pattern of pain which persists over an extended period of time but recurs as isolated pain episodes. This would represent daily pain over several weeks and may be due to a flare-up of peripheral tissue damage or underlying chronic pain, for example, due to degenerative disc or joint disease, headaches, gastrointestinal mobility, sickle cell disease.

Pain, and certainly chronic pain, can be classified as malignant (cancer) or benign (non-cancer) pain (Crue, 1983). Perhaps the least useful classification factor for pain is that of *intensity*. This is due to its inherent variability and its unique subjectivity. In a number of experimental studies identical electrical impulses were administered to individual participants and resulted in wide degrees of pain ratings (Shealy & Cady, 2000). Furthermore other factors may lower individual pain threshold (the point at which a given stimulus provokes pain report), such as fatigue, mood and sleep quality (Twycross, 1980).

There is considerable variation in the definition and classification of pain overall. However, the definition of chronic pain is relatively well classified within that of duration and affixed by location/s of pain.

1.22 Prevalence of Chronic Pain

Bonica (1990) suggested an estimated 15-20% of the population has acute pain at any one time, whilst 25-30% experience pain that is persistent and chronic. In a review of 15 epidemiological studies conducted in Western Europe, Verhaak and colleagues noted that in the adult population prevalence of chronic pain ranged from 2% to 40% with a point prevalence of 15% (Verhaak, Kerssens, Dekker, Sorbi & Bensing, 1998). Large scale mail

surveys in Australia, Wales and Sweden have found 20%, 25%-30% and 34.5% of respondents respectively indicated the presence of persistent pain (Blyth, March, Brnabic, Jorm, Williamson & Cousins, 2001; National Assembly for Wales, 1999; Beregman, Herrstrom & Hogstrm, 2001). A Scottish survey found that more than 50% of respondents reported chronic pain (Backcare, 2001). The Australian survey also found that prevalence within the older adult population rose to 50% (Blyth et al, 2001).

A World Health Organisation study of prevalence of persistent (chronic) pain in 15 primary care centres in Asia, Africa, Europe and the Americas reported an overall prevalence rate of 22%, yet there was considerable variability between sites (5%-33%). In developing or lower income countries (i.e, India, Nigeria, China and the Phillipines) comparable point prevalence rates of 18.5% were found (although for back pain alone; Volinn, 1997).

In general, gender differences exist with respect to the experience of chronic pain (Berkeley & Holdcroft, 1999; Fillingim, 2000). Females report more pain, in more areas, with greater frequency and for longer duration than males (Unruh, 1996). Gender may also moderate treatment response and the outcome of multidisciplinary pain management programmes (e.g., Fillingim, 2002; Fillingim & Gear, 2004; Keogh, McCracken & Eccleston, 2005).

The wide range in prevalence rates reported within the epidemiological literature may be due to a number of factors including: variable definitions of chronic pain between studies, measures used, pain region, sample size and sampling methods (Turk, 2002). These factors make the identification of a reliable prevalence estimate difficult, yet despite this, it is clear that a significant proportion of individuals, when solicited, report the experience of persistent and chronic pain, meaning that research within chronic pain populations is crucial.

1.23 Impact of Chronic Pain

From both a societal and personal perspective, chronic pain poses a significant challenge and burden (Breivik, Collett, Ventafridda, Cohen & Gallacher, 2006). Individuals experiencing chronic pain have more days off work, more contacts with health care services and greater medication use (Von Dorff, Kworken & Le Resche, 1990). Specifically, the direct health cost of back pain alone in the United Kingdom has been estimated at over £1.6 billion inclusive of hospital, specialist and community care, medication and investigations (Maniadakis & Gray, 2000).

Nevertheless, within the context of clinical practice, the individual human cost of chronic pain is distinctive. Individuals presenting to services often

wish to know whether their pain will disappear completely. Once persistent pain has been established for greater than six months there is little likelihood of complete pain relief (Thienhaus & Cole, 2003). Thus, the distinction between acute and chronic pain – regardless of underlying aetiology – becomes crucial. Acute pain is useful and serves a protective purpose. Indeed, Cousins (1989) argues that our survival is dependent on our reaction to acute pain. Without this, we would suffer unnecessary injury and potentially death. Acute pain serves to act as a warning signal to danger and indicates the presence of injury or disease that requires limited activity or body use or an avoidance response. When the limitation and/or pain recedes this indicates that the injury has healed or underlying disease or pathology has been removed or resolved. Thus, acute pain is an adaptive survival response necessary for life itself.

On the other hand, chronic pain offers little protective significance, persists following the expected 'normal' healing or recovery time, and over time interferes with daily activities and goals. The impact of chronic pain on physical and psychological functioning has consistently been found to have a poor relationship to pain intensity itself (Lame, Peters, Vlaeyen, Kleef, & Patijn, 2005). It is generally accepted that chronic pain is associated with poorer quality of life (Kempen, Ormel, Brilman & Relyveld, 1997; Schlenk,

Erlen, Dunbar Jacob, McDowell, Enberg & Sereika, 1998; Lame et al., 2005), general health and physical disability (Sullivan & Loeser, 1992; Becker, Bondegaard, Olsen, Sjogren, Becch, & Eriksen, 1997; Crombez, Vlaeyen, Heuts & Lysens, 1999), and social and psychological functioning (Gujere et al, 1998). Furthermore, chronic pain is consistently related to higher levels of anxiety, depression (Kraemlinger, Swanson, & Maruta, 1983; Romano & Turner, 1985; Breivk et al, 2006) and suicide (Tang & Crane, 2006). The existence of chronic pain is also a risk factor for social and occupational difficulties including work, financial, community contribution, self esteem and role maintenance (Chapman & Gavin, 1999).

Pain that interferes with appetite, pleasurable activities, sleep and relationships is a greater source of distress than pain which otherwise leaves an intact life, again regardless of intensity (Turk & Okifuji, 1996). Thus, it is more useful to focus on the disruption that chronic pain has rather than pain intensity. Over time, most individuals make attempts to adapt and therefore demonstrate either very little, or markedly exaggerated, pain behaviour. Whilst some may experience significant difficulties with a modest level of pain, other people may continue to function despite experiencing high levels of pain. Such suffering and disablement is not necessarily linked to pain

intensity but linked to depression, anxiety and a failure to cope with, or integrate, the pain into their overall life experience (Crue, 1983).

Acute pain is almost always self-limited. Pain relief occurs when the causal condition is resolved or nociceptive (neurophysiological) input is blocked by an analgesic agent. Nociceptive input reduces as a function of the healing process, thus, as healing takes place, pain intensity subsides. Physical and pharmacological intervention for the relief of acute pain are generally very effective. Acute pain models and treatment methods are often ineffective with chronic pain and can actually intensify pain experience and disability. Intervention and management of chronic pain therefore demands more resources and support than a sole practitioner can adequately manage. Thus, in order to gain a greater efficacy of intervention in chronic pain, a broader conceptual framework must be adopted.

There is now increased recognition that pain syndromes are influenced by multiple variables and complex perceptual experiences (Turk and Okifuji, 2002). Conceptualisations and intervention packages that follow and which include biological/physiological, psychological and environmental factors are better placed to explain the development and maintenance of chronic pain than purely biomedical or pharmacological practice (Robinson & Riley,

1999), which in the context of chronic pain prove ineffectual when administered in isolation. Therefore, empirical investigations that provide elucidation of such psychological variables, including the present study, are important.

1.3 Summary

Pain is a significant health and social issue, with a significant prevalence rate across cultures, gender and age group. Standard definitions of pain may fail to fully accommodate its variable manifestations, although adjunct categorisations and clarifications have been made. Pain does not always require a direct source of injury or damage. Furthermore, pain can be classified in a number of ways including by location, onset, intensity and duration. Pain that lasts over the normal healing period (approximately six months) is commonly termed as chronic pain. Chronic pain differs from acute pain in a number of ways. Whereas acute pain serves a useful purpose for survival, chronic pain does not and does not respond well to treatments which are effective for acute pain. Thus, the role of other explanatory factors for the maintenance and treatment of chronic pain have been raised, specifically that of psychological factors. A considerable amount of psychological research into pain and chronic pain has been conducted over

the last 50 years. The next chapter reviews the research which has advanced psychological theories and models of chronic pain.

CHAPTER 2 MODELS AND THEORIES OF PAIN

A considerable number of models and perspectives on pain have been proffered over the last century. Nevertheless, no singular model or theory is able to account for all aspects of pain or the chronic pain experience. In this chapter, the predominant models and theories which have influenced the study, understanding, and treatment of pain are discussed. First, biological and physiological conceptualisations of pain are introduced before moving onto biopsychosocial models and theoretical concepts.

2.1 Biomedical Models of Pain

Patients often make sense of their pain within the traditional biomedical model and thus it is important to give an overview of this perspective. Certainly, until about half a century ago, chronic pain problems were generally approached biomedically as a symptom of some underlying pathology.

The systematic study of pain can be dated back to the work of the French philosopher, Rene Descartes in the 17th Century. Whilst Descartes was not the first to speculate on the functions and mechanisms of pain, his conception of pain perception provided a scientific foundation for other models. Descartes

is also associated with the concept of dualism; that is, the distinction between the separate operations of the body (or machine) and mind (or soul).

For Descartes, pain was a reflex of the mind upon nociceptive stimulation of the body. Damage to the body was thought to stimulate neural pain pathways that then sent direct signals to the brain where the sensation of pain would be generated. Thus, pain was treated as a symptom, related to the severity of underlying pathology. The degree of pain experience would therefore be proportionally related to the amount of damage or pathology. Treatment based on a mechanistic perspective on pain would consist of two main features: first, investigations to localise the underlying pathology and following this, removal of the pathology for instance, through surgery or anaesthesia.

This model was extremely influential. It stimulated research of the anatomy and physiology of pain and in particular the identification of pain fibres, pathways and cortical regions or sites for pain. Specificity theories were predominant from around the mid 19th Century with the idea that specific pathways and receptors existed for pain. Yet, specificity theories such as Descartes' could not explain the existence of pain without observable pathology – for example, in cases of back pain, or headache. In the absence of

injury or disease, this model assumed that the mind was at fault and the pain was labelled as psychological.

This observation led to the development of 'pattern' theories of pain.

Goldschneider (1894) proposed that certain patterns of nerve activation were produced by the summation of sensory input from the skin within the dorsal horns (in the spine). It was argued that this 'central summation' in the dorsal horns was one of the critical factors in influencing pain. Nafe (1934) introduced the concept that all sensation is the result of spatial and temporal patterns of nerve impulses rather than as a result of specific receptors or pathways. To explain summation, referred pain and persistent pain after the completion of the healing process, Livingston (1943) proposed the existence of a reverberatory circuit, where sensory input 'echoed' within the dorsal horns. Noordenbos (1959) hypothesised that large - diameter nerve fibres inhibited small - diameter fibres. Large-diameter and small - diameter fibres are two types of specialised neural fibres that transmit signals to the spinal cord. Large-diameter fibres are specialised in transmitting signals relating to tactile information (e.g. touch). On the other hand, small-diameter fibres transmit information related to nerve damage. Noordenbos added that the substantia gelatinosa in the dorsal horns played an important role in summation.

Although pattern theories of pain made a move towards the involvement of the spinal cord and afforded further advancement in the study of pain, this body of work has been criticised as both vague (Melzack & Hall, 1996) and lacking an explicit role for the brain over that of a receiver of nociceptive messages (Melzack & Katz, 2004). Even contemporary commentators objected to pattern theories on the grounds that reception of pain differed from reaction to pain and that the sole focus on the former was inadequate (Hardy, Woolf & Goodell, 1952). An exclusive understanding of pain based on the anatomy, physiology or biochemistry associated with nociception – that is the neurophysiological activation of the nervous system – was erroneous as pain is not solely a response to nociception. There was an early recognition that psychological variables likely influenced pain. The Gate Control Theory (Melzack & Wall, 1965) represented a Kuhnian shift of paradigm and was the first published pain model to actively acknowledge the contribution of such variables.

2.2 The Gate Control Theory of Pain

The Gate Control Theory of pain (Melzack & Wall, 1965) was the first theory of pain to incorporate the central control processes of the brain and was clearly influenced by Nordenboos' earlier pattern theory. The Gate Control Theory postulates that the transmission of nerve impulses from fibres to the

spinal cord transmission cells ('T' cells) is modulated by a gating mechanism in the spinal dorsal horn. The gating mechanism itself is influenced by the relative amount of activity in small and large diameter fibres. Large fibres that are specialised in transmission of tactile information will tend to inhibit transmission of nerve impulses (i.e., close the gate). Small fibres specialised to transmit information about nerve damage will tend to facilitate transmission (open the gate). Furthermore, they hypothesised that the gating mechanism is also influenced by nerve impulses descending from the brain. Melzack and Wall also went on to argue that the experience of pain was jointly determined by physiological, motivational, cognitive and emotional factors (Melzack & Wall, 1965) and proposed that that psychological variables such as attention, fear and expectations could modulate the gate mechanism through descending pathways.

That pain was not just the result of the processing of peripheral nociceptive information (as in the traditional Cartesian biomedical model) but modulated by the integration of physiological and psychological information through a central cortical centre was revolutionary and stimulated a considerable debate. The theory's emphasis on modulation and the dynamic role of cortical processes had a significant scientific and clinical impact. Psychological factors previously dismissed as solely reactions to pain were

taken as an integral to the understanding of pain. The Gate Control Theory assisted in explaining pain without observable injury and injury without pain (Wall, 1999). However, it was unable to explain the phantom limb phenomenon and the gate itself remains a metaphorical construct as no reliable physical gate has been identified. Nevertheless, it was a multifactorial integrated model that shifted the focus from a purely biological one. It also provided a useful metaphor for patients to surpass the controversial and dualistic psychogenic/organic debate.

2.3 Concept of a Neuromatrix

More recently, Melzack (1999) has proposed a 'neuromatrix' model of pain, expanding on the dynamic role of networks within the brain to explain the experience of pain. The concept of a 'neuromatrix' was stimulated by the inability of the Gate Control Theory to explain the presence of limb pain in amputees or those with complete spinal cord resection.

Melzack proposed that the brain possesses a neural network, termed a 'body-self matrix' which is genetically set (although modifiable to a degree through experience) and integrates multiple inputs through sensory, limbic, thalamic and cortical loops. It has been suggested then that the neural networks for perceiving the body and its constituent parts are built into the brain. Various

brain regions produce cyclical processing and synthesis of nerve impulses through the neuromatrix that produces 'neurosignatures', including neurosignatures for pain. These neurosignature patterns can be modulated by sensory inputs and cognitive events (such as memory, attention and psychological stress).

Additionally, Melzack proposed that physical as well as psychological stressors act on stress-regulation systems that attempt to maintain homeostasis. Thus, in pain, lesions or muscle deterioration and efforts to achieve homeostasis, such as withdrawal, rest and inactivity, are looped back into neurosignatures for pain. Thus, with the concept of a neuromatrix, the failure of homeostatic regulation could potentially contribute to the development of chronic pain conditions and also neurosignatures for pain continuing to generate messages about pain as part of the maintenance of chronic pain.

The neuromatrix concept is relatively new and has endeavoured to explain the phenomenon of phantom limb pain. There is potential for extending its principles to that of chronic pain. However, there are no direct tests of the concept of a neuromatrix in chronic pain, with most of the discussion related to the role of the brain's homeostatic regulation systems and the wider role of

stress on pain (e.g., Melzack, 1999). The concept of a neuromatrix requires further empirical exploration and validation within the chronic pain population.

2.4 Biopsychosocial Models of Pain

2.4.1 Premises and assumptions of the biopsychosocial approach

The biopsychosocial model has been instrumental in the development of cognitive-behavioural approaches to chronic pain. Engel (1977, 1980) was strongly in favour of a broader biopsychosocial perspective on illness. Thus, compared to the biomedical model, the focus here is on illness rather than disease, with illness viewed as a type of behaviour. The term 'Illness behaviour' has been used to describe the 'ways in which...symptoms may be differently perceived, evaluated, or acted upon (or not) by different kinds of persons' (Mechanic, 1962, p.189). The processes in illness behaviour are considered to be dynamic and the relative contribution of biomedical, psychological and social variables can vary (Engel, 1977). The biopsychosocial view is that these variables can both cause and perpetuate an individual's response to illness. Therefore, although a condition may be initiated biologically, over time the psychological and socio-contextual factors may come to play the predominant role in the maintenance and

exacerbation of a health condition. This approach strongly maintains that no single factor can fully explain an individual's response to pain (Turk, 1996).

In the context of chronic pain, the biopsychosocial approach goes further than the Gate Control theory (Melzack & Wall, 1965). Whereas both the Gate Control Theory and biopsychosocial view clearly stipulate that the relationship between tissue damage and pain is not conditional, the latter goes further by emphasising that the relationship between pain and level of disability and functioning is not entirely linear. Waddell (1987) and Peters, Vlaeyen and Weber (2005) have found low correlations between pain intensity, pathological signs of damage and self - reported functional disability. Level of disability and suffering is variable despite equivalent reported pain intensity. This means that other processes than pain itself are indicated in the extent to which an individual functions with chronic pain. The Gate Control Theory and, perhaps to a lesser extent, the neuromatrix of pain fail to account adequately for the role of individual differences in the experience of chronic pain. These individual differences can be complex and also important in accounting for the heterogeneity of the chronic pain population. Thus investigations, such as the current study, that aim to identify the intricate relationships between individual variables, are imperative to the greater understanding of pain.

There is a degree of overlap between the various biopsychosocial models although each places different emphasis on elements of the triad:

a) biological; b) psychological, inclusive of behaviour, emotions, beliefs, coping strategies; c) and social and cultural contexts, including the response of others, socio-economic status and interpersonal relationships.

Predisposing factors (e.g., personality, hereditary factors, social conditions) and precipitating factors (e.g., a virus, injury, accident or other significant event/s) are indicated alongside maintenance factors. Some of the most influential biopsychosocial explanations of chronic pain are the operant model, stress-diathesis model, fear-avoidance model and more recently Sullivan (2008) proposed a bio-psycho-motor model. Each is discussed in turn.

2.4.2 Operant Models

Fordyce and colleagues were the first to apply the principles of operant conditioning to the problem of chronic pain (Fordyce, 1976; Fordyce, Fowler & Delateur, 1968; Fordyce, Shelton, & Dundore, 1982). Their operant model described how positive and negative reinforcement serve as mechanisms through which acute pain behaviours are maintained over a period of time to become chronic pain.

Central to the operant model is the concept of 'pain behaviours'. Pain behaviours refer to the observable signs or behavioural reactions to pain. Examples of pain behaviours are: avoidance or withdrawal from activity, limping or other postural changes, wincing, grimacing, or vocalisations, for instance, gasping or groaning. The main principle of the model is that, in response to an acute injury, people employ pain behaviours that have an adaptive function in reducing the likelihood of further injury or pain. Hence, over time, behaviours that reduce pain are negatively reinforced. In the longer term, such behaviours persist and become maladaptive when a system of external positive and negative reinforcements widen (such as, the reduced need to become involved in tasks, increased social contact and attention from partners, family members or friends). As time progresses and these behaviours persist, there is a decline in physical activity, associated muscular deconditioning and increased medication use. These actions then maintain the repertoire of (and, potentially, the development of additional) pain behaviours perpetuating the experience of chronic pain.

Empirical support for the operant model comes predominantly from the outcome literature evaluating operant based interventions (e.g., Morley, Eccleston, & Williams, 1999). Indeed, Fordyce and colleagues published one of the first sets of outcomes for a biopsychosocial treatment of chronic pain

(Fordyce et al, 1968). Operant based interventions concentrate on the identification and reduction of chronic pain behaviours and encouraging individuals to re-engage in previously avoided activities. Asmundson and Wright (2004) noted that there have been few empirical studies specifically testing the validity of this model. Differences between chronic pain patients and healthy controls in pain report following electrical stimulation have been found and chronic pain patients were more likely to report pain following stimulus extinction than healthy controls (Flor, Knost, & Birbaumer, 2002).

Other investigators, however, have been unsuccessful in confirming a direct operant conditioning link in pain (e.g., Lousberg, Groenman, Schmidt, & Gielen, 1996). Consequently, intervention outcome studies have provided the most evidence for the operant approach, including a fairly recent meta-analysis (Morley, Eccleston, & Williams, 1999), although others have described the evidence base as unclear (Turk, 1996). Despite this, the operant model of pain is important as it has provided the basis for successful cognitive and behavioural interventions. The operant model does not include belief systems, cognitive or other social/environmental factors which may influence the behavioural context of chronic pain.

2.4.3 Stress-Diathesis Model

The stress-diathesis model, also known as the biobehavioural model, was proposed by Turk and incorporates both cognitive and behavioural aspects in its account of predisposition to, and perpetuation of, chronic pain (Turk & Flor, 1999; Turk, 2002). In this model, the role of an individual's attributions, expectations, prior learning experience, self efficacy, personality and the traumatic onset of pain were emphasised (Turk, Meichenbaum and Genest , 1983). These are considered important due to their potential to facilitate or disrupt an individual's sense of control and ability to manage their pain (Turk, 1999).

The model contends that some individuals have a predisposition, or diathesis, for a reduced threshold for nociception and therefore have a tendency to respond to body sensations with fear. The diathesis can result from genetic, hereditary or personality factors, social learning, prior trauma or a combination of these factors. The interaction between this diathesis and stressors is considered vital in this model. Here, adverse physical responses, such as pain or anxiety interact with a predisposition through the process of appraisal. More recently, research has revealed that higher neuroticism as a pre-existing personality trait may predispose some individuals to poor adjustment to chronic pain (Affleck, Tennen & Urrows, 1992; Affleck, Urrows

& Tennen, 1992; Ashgari & Nicholas, 2006). The model, however, does not adequately explain the role of genetic or hereditary factors and the evidence base for this proposition is potentially confounded by methodological flaws, such as the lack of longitudinal measurement and the use of measures which may be psychometrically unreliable (Ashgari & Nicholas, 2006).

According to the Stress-Diathesis model, the beliefs an individual possesses, develop over the course of his lifetime, influence how he attends and responds to pain. Negative appraisals of pain, fear, catastrophic interpretations, low confidence in existing coping strategies, hypervigilance to symptoms and the resulting behavioural responses (e.g., avoidance or engagement in activities and/or social interaction) therefore play an important role in the maintenance and exacerbation of pain symptoms.

The significance of patient beliefs in chronic pain has gained increasing support from the pain literature (Turk & Okifuji, 2002). Pain-related beliefs include those regarding pain onset and the meaning of physical symptoms, patient's ability to control their pain, beliefs about the impact of pain on his or her life, and worry about the future. Similarly, such beliefs are associated with physical and psychological functioning (Jensen, Romano, Turner, Good & Wald, 1999; Turner, Jensen & Romano, 2000), in addition to coping

(Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995) and treatment response (Tota-Faucette, Gil, Williams, Keefe & Goli, 1993). A belief that certain activities may lead to an aggravation of an underlying condition or previous injury may lead to the individual avoiding that activity or situation (fear-avoidance). Traumatic onset has also been associated with greater perceived pain severity compared to a gradual onset, regardless of equivalent physical pathology (Greenfield, Fitzcharles, & Esdaile, 1992; Turk, Okifuji, Starz & Sinclair, 1996). However, the assumption of traumatic onset within this model immediately discounts the significant number of instances of chronic pain with insidious onset.

The psychological construct of self – efficacy (Bandura, 1977) is also important in the concept of stress-diathesis and has gained a great deal of attention within the pain literature, particularly in relation to its mediating effect on pain tolerance (Dolce, Doleys, Raczynski, Lossie, Poole & Smith, 1986). An individual's beliefs about how effective their coping skills are and whether they feel able to execute these skills in managing the effect pain has on their lives ('self efficacy beliefs') have been associated with disability, depression and coping in chronic pain (Turner, Ersek & Kemp, 2005).

Attributions that a physical sensation or symptom such as pain is harmful and/or related to an injury can lead to an increase in anxiety and stress. This increase can lower pain threshold, increase activity avoidance and limit overall functioning (Turk & Okifuji, 1996). Chronic pain patients who make more maladaptive cognitive errors (such as catastrophisation) regarding their pain and situation tend to become more psychologically distressed (Turk, 1999) and have greater physical and occupational disability (Vlaeyen, Kole Snijders, Boerem & van Eek, 1995; Buer & Linton, 2002; Fritz, George & DeLitto, 2001).

The stress-diathesis model was important as it explicitly considered the role of stress and mood in the development and maintenance of chronic pain. It also considered the role of prior learning and individual differences and how these influence appraisal of physical symptoms. It placed an emphasis on cognitive variables in the perception of pain and warranted the development of psycho-social interventions that focused on changing maladaptive beliefs and fear related assumptions, aiming to increase self efficacy and coping strategies. The stress-diathesis model led to further investigation of the role of fear-avoidance beliefs. Yet, although there is acknowledgement of the role of psychological constructs such as self-efficacy and (perceived) control, there seems to be much more emphasis on predisposition, the interpretation

of symptoms and consequent behaviour with the mediating effects of self-efficacy and control beliefs not being fully integrated in this model.

2.4.4 Fear-Avoidance Model

The specific role of fear and avoidance behaviour in chronic pain has received considerable attention over the past decade (Vlaeyen & Linton, 2000). Earlier research on the function of anxiety in pain perception (Rowbottom, 1946), previous operant conditioning (Fordyce, 1976) and stress-diathesis (Turk & Flor, 1999) models was expanded within fear-avoidance models.

Lethem, Slade, Troup and Bentley (1983) attempted to explain the process by which fear and avoidance remain when tissue damage remits. They found this was due to the initial avoidance response to pain continuing whilst fear of the consequences of activity on pain increased, exacerbating avoidance and physical disability. Phillips (1987) incorporated avoidance hypotheses from the original cognitive theory of avoidance (Seligman & Johnson, 1973) to help explain why behavioural avoidance continued in the absence of reinforcement (e.g., avoiding walking a certain distance when pain is continuous regardless of whether this is undertaken or not). Inspired by this and their own earlier work in this area (Linton, Melin & Gotestam, 1985;

Vlaeyen et al., 1995), Vlaeyen & Linton (2000) proposed a comprehensive model of chronic musculo-skeletal pain.

In their model, Vlaeyen and Linton (2000) propose that the experience of continuous pain following the recovery period of injury can be construed in two ways; either through confrontation or avoidance. The latter operates through the cognitive process of catastrophising and fear of movement/re-injury. If the pain experience is interpreted as non-threatening; for instance, as a temporary state or hindrance that can be overcome or managed, then its effect can be confronted and dealt with in an adaptive manner that allows the individual to recover. On the other hand, if the pain experience is interpreted as threatening, (e.g., that it will never resolve), it is more likely to lead to a maladaptive response (for example, over resting) which perpetuates a cycle of fear-avoidance. Over time, this cycle leads to increased de-conditioning, anxiety, pain and further disability.

Hence, whilst there is a degree of overlap between stress-diathesis and fear-avoidance models, in particular the acknowledgement in both of the central role of cognitive interpretation of pain symptoms, the explicit fear-avoidance model does not include the potential influence of prior learning experiences or predisposing factors as considered within the biobehavioural perspective,

thus minimising individual differences that may be important in identifying individuals at risk of developing chronic pain earlier in the care process.

Admundson and Wright (2004) and Sharp (2001) recognised the shortcomings of separate models and proposed an integrated biopsychosocial model of pain. Here, physiology, vulnerability factors (such as personality, reduced threshold for nociception), tendency to catastrophise and react with avoidance, and the development of a self-reinforcing vicious cycle that perpetuates and further exacerbates chronic pain.

Fear-avoidance models have predominantly focused on musculoskeletal pain syndromes and therefore these models have not been empirically validated with other chronic pain syndromes, although a recent validation study on the fear-avoidance model by Cook, Brawer and Vowles (2006) did include neuropathic diagnoses.

Sullivan (2008) advanced that current biopsychosocial models of pain have tended to emphasise the role of cognitive and social factors on pain and behaviour to the exclusion of the mediating role of behaviour itself. Sullivan proposed that communicative pain behaviours, protective pain behaviours and social response behaviours serve differing purposes for individuals and are functionally distinct from the perception of pain sensation. Treatments

directed predominantly at cognitive and affective elements of the pain experience are inadequate. Sullivan postulated that a bio-psycho-*motor* conceptualisation of pain which allows greater focus on the behavioural systems in the development and maintenance of chronic pain syndromes, would provide a better framework for understanding and treating chronic pain.

Even still, integrated biopsychosocial models fail to directly include the role of other patient beliefs that the evidence base has shown are influential in explaining individual differences in adjustment to pain, including self-efficacy, coping, perceived control and, more recently, acceptance of pain. This is despite a growing body of evidence for chronic pain interventions that aim to increase such beliefs. Empirical investigations looking at the impact and relationship of these psychological beliefs and variables on adjustment and functioning and the efficacy of therapeutic interventions that encompass them has been carried out, yet their roles have not been explicitly included in most biopsychosocial models.

2.5 Summary

Various theories and models have been proposed to explain how the pain experience develops from acute to chronic pain. The traditional biomedical model of pain and its premise that pain is a sensory experience involving nociceptive stimulation as a direct result of injury or other pathology held considerable influence right into the 20th Century and is often the predominant view of patients. Melzack and Wall's 1965 Gate Control Theory of pain was the first to recognise the dynamic role of the brain in addition to the wider central nervous system and to integrate physiological and psychological mechanisms into a single model. Melzack has further elaborated on his previous seminal work by attempting to explain the experience of phantom limb pain through his neuromatrix theory, although the relationship of the neuromatrix to other pain syndromes requires further clarification. Biopsychosocial models of chronic pain that incorporate the interaction of biological, physical, cognitive, affective, behavioural, social and cultural variables have been dominant within the chronic pain literature. These include models based on operant conditioning principles, social learning theory, certain cognitive appraisals, fear-avoidance and personality. Cognitive-behavioural interventions are based on the premises of such models. Yet existing conceptual models of pain do not adequately scope the role of coping, perceived control, and pain acceptance in understanding and

treating chronic pain. Research has shown that relationships exist between these variables and functioning, adjustment and pain and the literature has explored these in more depth. Chapters 3 and 4 will elaborate on these groups of work.

CHAPTER 3 COPING AND CONTROL IN CHRONIC PAIN

3.1 The concept of coping and chronic pain

Whilst chronic pain can lead to dysfunction and adjustment difficulties in some, others appear to adjust to the ongoing experience of pain relatively well (Taylor & Curran, 1985). This has stimulated debate and research on what factors promote adaptive functioning in the continued presence of pain. Models of stress and coping have been cited to provide an explanation for differing levels of adjustment to chronic pain (e.g., Keefe et al, 1987; Turner, Clancy, & Vitaliano, 1987). It has been proposed that coping appraisals have an important role in the differential adjustment of individuals who experience chronic pain (Turk, 1994).

Coping has been defined as the way in which an individual reacts to situations that need to be adapted to reduce or eliminate a stressful event (Vlaeyen, Crombez, & Goubert, 2007). Coping efforts are required to be purposeful (Burish & Bradley, 1983) and it has been argued that, if a response is automatic and/or non-effortful, regardless of it being adaptive, then it should not be considered a coping response (Lazarus & Folkman, 1984).

A distinction has been made between problem-focused coping strategies and emotion-focused coping strategies. In the case of chronic pain, active and passive focused coping strategies have also been categorised (Brown & Nicassio, 1987). Problem-focused strategies aim to solve the pain problem. The aim of emotion-focused coping strategies is to reduce pain intensity or pain associated distress. Active coping efforts are defined as responses that require an individual to initiate some behaviour or action to manage their pain (for instance, through exercise). On the other hand, passive coping efforts involve an individual withdrawing, (e.g., rest) or using an external source of control (e.g., medication use).

Research that has empirically investigated the effectiveness of specific pain coping strategies appears to have been more successful in identifying unhelpful rather than helpful strategies. The literature identifies cognitive and behavioural strategies that if used persistently may become maladaptive, for example; resting, excessive passivity (Brown and Nicassio, 1987; Jensen, Turner & Romano, 1991) and catastrophising about pain (Main & Waddell, 1991; Jensen, Turner & Romano, 1992; Turner & Aaron, 2000; Tan, Jensen, Robinson-Whelen, Thornby & Monga, 2002). Furthermore, one recent study (Jensen, Turner & Romano, 2001) examined changes in coping strategies as a result of a multidisciplinary pain intervention. They found that belief in pain

as disabling and/or as a signal of damage, catastrophising, guarding and excessive resting were positively associated with greater levels of depression, lower physical functioning, and greater healthcare use and pain intensity. Such coping strategies could therefore be viewed as maladaptive. However, a few studies have found task persistence is consistently associated with less disability (Jensen, Turner, Romano, & Strom, 1995; Tan, Jensen, Robinson-Whelen, Thornby & Monga, 2001; Romano, Jensen & Turner, 2003). Given this, Geisser and colleagues argued that the main focus of treatment should focus on reducing unhelpful coping strategies rather than increasing helpful strategies, as these may be more difficult to determine.

There would appear to be a negative association between certain (maladaptive) coping responses and poorer adjustment to pain. However, these responses tend to be overt and observable, potentially ignoring behaviours or other psychological processes which may be automatic and/or covert. Thus, reliance solely on clarifying the usefulness of coping responses may not be enough to comprehensively explain adjustment to pain. Certain beliefs, attitudes and appraisals may also facilitate coping and adjustment to pain, for instance, control appraisals. In particular, perceived control has been shown to mediate the individual choice of coping strategy used to deal

with stressful events (Conway & Terry, 1992). It may do this by exerting its effects on functioning and mood via a coping strategy.

3.2 Perceived Control

In a coping based model, pain is viewed as a stressor, whereas coping is the purposeful effort to manage it (Lazarus, 1966; Lazarus & Folkman, 1984).

Appraisals, or beliefs about pain, are believed to be instrumental in the coping process. Appraisals influence the initiation of coping efforts and the maintenance of a sense of wellbeing (Bandura, 1977, 1986; Lazarus & Folkman, 1984).

Early research in the 1980's found that control appraisals, that is, beliefs in the personal ability and resources to manage pain, were positively correlated with adaptive psychological functioning, coping and adjustment and these findings have been replicated in subsequent studies (Rosentiel & Keefe, 1983; Turner & Clancy, 1986; Affleck, Tennen, Pfeiffer and Fifield, 1987; Keefe et al, 1987; Spinhoven et al, 1989; Jensen & Karoly, 1991, Jensen et al, 1991; Jensen et al, 2001; Williams et al, 2004). In addition, positive relationships were found between control appraisals and activity levels in chronic pain samples (e.g., Jensen & Karoly, 1989; Jensen, Karoly & Huger, 1987). These studies also found that an individual's sense of control over their pain was generally

reflected in their coping efforts. Such findings were important as they directed intervention efforts towards fostering a greater perception of control in patients with chronic pain.

Perceived control has been defined as 'the belief that one has at one's disposal a response that can influence the adversity of an event' (Thompson, 1981, p.90). However, this definition is not specific to pain perception per se. Hence, there are references to different aspects of perceived control in the literature. The most common is perceived control over pain and indeed the majority of the research in this area refers to this. However, there can also be perceived control over the effects of pain and perceived control over life in general (Tan et al., 2002). Therefore, it is important to be specific within research of what level of perceived control one is investigating¹. Perceived control has been identified as a contributory factor in acute pain perception and the report of pain (Litt, 1988; Miller, 1979, 1980). Control has been further construed in two ways: 1) instrumental, where a behavioural response is available and 2) cognitive, where a cognitive strategy is available (Litt, 1988; Thompson, 1981).

¹ In the present study, this is perceived control over pain and, to a lesser degree, the perceived control over the effects of pain on life. Indeed, the vast majority of research has investigated perceived control over pain. Thus, unless otherwise stated, where perceived control is referred to presently, the reader should assume this is perceived control over pain.

Experimental studies have revealed that perceived control contributes to greater pain tolerance during the application of electric shocks or immersion in cold water (cold pressor task; Craig & Best, 1977; Williams, Golding, Phillips & Towell, 2004). Williams et al. (2004) also found that the denial of perceived control increased pain perception particularly when participants were told what to expect during the task. From this it was concluded that expectations about a potentially pain inducing stimulus could exacerbate the pain response if an individual was not given some potential method or opportunity of influencing it (i.e., a degree of perceived control), whether this was taken up or not.

Feldner and Hekmat (2001) also investigated the extent to which perceived control over pain-related anxiety contributed to the perception of pain stimuli during a cold pressor task. Whilst level of perceived control did predict participants' behavioural response and pain endurance, this was not the case for pain-related anxiety or physiological response (heart rate). The findings of Feldner and Hekmat's (2001) study are interesting in that perceived control is likely not to change the perception of pain per se but could influence how an individual responds to pain. This is an important discovery as in order to function, a person with chronic pain may continue to experience pain. Perceived control may be an important mediator in this.

Indeed, perceived control has also been found to be associated with both psychological and physical functioning. Affleck et al. (1987) observed that patients' level of perceived control of pain was positively associated with mood and adjustment to their rheumatoid arthritis, albeit the latter variable was rated by observers, and not by patient self report. Similarly, Keefe and Williams (1990) noted that perceived control was negatively associated with depression.

Chronic low back pain patients who possessed a sense of control over their pain were found to be less likely to report that pain interfered with their day-to-day functioning (Strong, Ashton, Cramond & Chant, 1990). Jensen and Karoly (1991) examined the interaction of pain severity with patient's control appraisals in predicting functioning. They found that belief in control over pain was positively related with activity levels in those with low pain severity only, although a similar relationship was found between perceived pain control and psychological functioning in all participants regardless of reported pain severity. Moreover, 66% of individual factor variability in predicting functioning was accounted for by perceived control of pain. In a review of the literature, Jensen, Turner, Romano and Karoly (1991) concluded that those who functioned better were individuals who held the belief they could control pain. Low levels of catastrophising and a belief that

their pain was not disabling were also important. The research evidence, then, consistently shows that having a high degree of perceived control has positive benefits for pain tolerance, mood and physical functioning. Hence, perceived control is likely to be important in the adjustment of individuals to continued pain.

In discussing their study findings, Jensen and Karoly (1991) asked whether the impact of perceived control on coping and adjustment could be consistent with existing psychological concepts such as self efficacy (Bandura, 1977) or learned helplessness. Self-efficacy is commonly described as the belief that one can do what one has set out to do (Turk & Feldman, 1992). There is some evidence that those with greater perceived helplessness reported higher levels of pain intensity, severity, activity interference and clinic consultations (in parallel with the impact of perceived control; Smith, Peck & Ward, 1990). Turk and Feldman (1992) suggested that if their findings were reflective of learned helplessness, increased psychological functioning would be due to greater perceived pain control. They argued that Social Learning Theory on the other hand would posit that having belief in the ability to control pain directs individuals to instigate and persevere with coping strategies that are adaptive. Their results were more reflective of

this latter hypothesis. Thus, whilst the perception of helplessness and control may be theoretically distinct, perceived control and self-efficacy may not.

Perceived control over pain-related events therefore is a process variable that has been shown to affect the pain experience, including functioning and mood. Generating the perception of control over pain may change the patient's perception of an event – from one that is potentially unendurable to one that is manageable (Thompson, 1981). According to cognitive-behavioural models of pain, the presence of pain alone is insufficient for the development of mood disturbance, such as depression. An individual's cognitive appraisals about the perceived impact of pain and the perceived ability to control his or her life appear to mediate the relationship between pain and psychological functioning (Turk, Okifuji, & Scharff, 1995; Rudy, Kerns & Turk, 1988).

Furthermore, control does not actually have to be provided, it just needs to be available (Law, Logan & Baron, 1994; Litt, 1988; Thompson, 1981). It is suggested that promoting the perception of control by encouraging the patient to be an active participant should be included within treatments for chronic pain (Skevington, 1995; Williams et al., 2004). Arntz and Schmidt (1989) suggested that perceived control might modify the meaning of a pain

inducing stimulus by reducing its perceived threat. More specifically, perceived control over a pain inducing stimulus may alter the perceived threat of it, such that people may be more willing to tolerate and endure pain. Similarly if the perceived threat of a pain inducing stimulus was altered, perceived control would not necessarily be related to pain intensity.

Feldner and Hekmat (2001) further surmised that a change in the meaning of pain suggests that the response to pain could be affected but that the pain experience itself may remain unaltered. Thus, if the perception of pain is altered then the behavioural response to it might also be altered in spite of little change in the affective or cognitive experience. Furthermore, the results advocate that in chronic pain, where the experience of pain may be constant, attempts to alter perceived control may be more effective than active attempts to change momentary (state) anxiety or the nature of the pain itself.

3.3 Control based approaches in chronic pain

Cognitive-behavioural models of pain posit that chronic pain management programmes are effective at least partially due to changes in cognitive, affective and behavioural response to pain. Based on the premise that maladaptive pain appraisals bear a negative influence on coping, adjustment, psychological wellbeing and pain, the aim of chronic pain interventions

should then be to actively decrease maladaptive beliefs and interpretations and increase adaptive appraisals and reduce unhelpful responses (Turk, 1994).

Early cognitive-behavioural interventions (CBT) for chronic pain emphasised the acquisition of adaptive coping strategies and increased self control. CBT interventions tend to focus primarily on pain or stress and aim to modify attributions and expectations regarding pain control and impact (Vlaeyen et al., 2007). There are a number of components to the cognitive behavioural treatment of chronic pain, which can vary within practice (Hadjistavropoulos & Williams, 2004).

First, there is often education about pain, which includes the acute/chronic pain distinction, incongruence in the physical findings in persistent pain, and psychological models of pain. A collaborative approach between clinician and patient is encouraged and the patient is motivated to take an active role (Turk & Rudy, 1989). Second, the importance of exercise is emphasised for two reasons: muscular re-conditioning and to address fears about movement and re-injury. Skills in relaxation and, to some degree, attention diversion (from pain) are taught. Behaviour management is also a core component with goal setting, activity scheduling and pacing encouraged with the focus

on increasing adaptive 'well' behaviours. Cognitively, problem solving strategies (D'Zurilla & Goldfried, 1971) can be taught and cognitive restructuring, particularly the identification and modification of catastrophic thinking are attempted. Finally, flare-ups of pain and situations where an individual might potentially experience set backs are also discussed and the management of these is planned.

A number of systematic reviews assessing the efficacy of cognitive and behavioural interventions for chronic pain have been carried out. Morley, Eccleston and Williams (1999) conducted a meta-analysis of 25 randomised controlled trials of cognitive and behavioural treatments published over a 12 year period. This review included a wide range of chronic pain syndromes but excluded headache. Morley and colleagues concluded that CBT interventions were effective across a range of outcome variables compared to waiting list and treatment as usual conditions; in particular, pain experience, mood and affect, cognitive coping and appraisals, pain behaviours, physical and social functioning were improved.

A systematic review by Van Tulder, Ostelo and Vlaeyen (2000) of behavioural treatments for chronic low back pain found beneficial effects on psychological, but not physical, functioning. In one study, CBT was found to

be no more effective than respondent treatments, such as biofeedback, for headache (Compas, Haaga, Keefe, Leitenberg, & Williams, 1998). A large meta-analysis (including nearly 3, 000 patients with recurrent headache) conducted by Bogaards and ter Kuile (1994) found that biofeedback, relaxation and cognitive therapy were superior to attentional control only or no treatment.

It should be emphasised that there is considerable variability in the components of cognitive and behavioural treatments that have been examined in such studies. It has been difficult to isolate or determine the active ingredients in multi-component treatments (Fishbain, 2000) and trials seeking to disentangle such components have been inconsistent (Morley et al., 1999, Morley & Williams, 2000). This is likely to reflect differences in study criteria and local treatment packages, yet perhaps also reflects intrinsic differences between chronic pain groups – which are generally studied as a homogenous group or by diagnosis or regional site – and individual differences between patients and their circumstances. However, recent work examining mechanisms of therapeutic change in CBT for chronic facial pain found that changes in perceived control over pain explained 92% of the treatment effect on interference with activity levels and 81% of the total treatment effect (with a change in belief in the pain as disabling also

important). This was consistent with earlier studies with this group (Turner, Holtzman & Mancini, 2006; Turner, Whitney, Dworkin, Massoth & Wilson, 1995).

3.4 Summary

The concepts of coping and control in chronic pain were influential in the development of cognitive and behavioural interventions. These aim to promote a greater sense of personal control over pain and its subsequent effect on functioning, in addition to the development of adaptive coping and management strategies. A number of experimental studies have suggested that the presence of perceived control when experiencing pain may influence an individual's response to, and endurance of, pain despite the sensory experience of pain still being present. This is important as pain can remain stable in chronic pain. Therefore, individuals who have a greater level of perceived control may adjust better to the pain experience. Cognitive-behavioural interventions that involve a multi-factorial approach to pain and include methods to increase actual and/or perceived control over pain could be effective in increasing overall adjustment. Cognitive and behavioural methods have been widely employed and studied and include education, exercise, relaxation, activity scheduling and pacing of activity, increasing adaptive behaviours (and concurrently decreasing maladaptive ones), and

minimising catastrophic thinking and other cognitive errors. As work continues in this area, further avenues for increasing the efficacy of psycho-social treatments and understanding of chronic pain have been explored. The psychological construct of acceptance and its role in chronic pain is one of these and is discussed in the next chapter.

CHAPTER FOUR: ACCEPTANCE AND CHRONIC PAIN

4.1 Introduction to Acceptance

4.1.1 Definition of acceptance

The potential role of acceptance in facilitating adaptation to chronic pain has gained momentum in the last decade within clinical and empirical arenas.

The word 'acceptance' derives from the Latin root word 'accipere' which means 'to take or receive what is offered' (Hayes, Bissett, Korn, Zettle, Rosenfarb, Cooper & Grundt, 1999a, p.34). Therefore, what is happening must be 'taken in' in some form. Indeed, Linehan (1994) remarked that, from a therapeutic stance, acceptance is required for both clinician and patient to be in the room as it must be acknowledged, or 'taken in' that some difficulty exists.

From a psychological perspective, acceptance has been generally defined as a willingness to remain in contact with, and to actively experience, private experiences (such as thoughts, feelings and body sensations) without having to follow them or change them (Hayes, Jacobson, Follette & Dougher, 1994). However, other researchers have termed acceptance differently. Jacobson and Christensen (1996) refer to acceptance as a social construct where an individual abandons his efforts in order to effect change in another person's

actions. Mason, Mathias and Skevington (2008) highlighted the potential for acceptance to be construed in both a negative and positive manner; for instance, acceptance as resignation or where a passive absence of a struggle exists. In this case, it has been found that resigned acceptance within the context of health promotes feelings of helplessness and has also been associated with depression (Abramson & Seligman, 1978; Romano & Turner, 1985). Mason et al. (2008) counter that acceptance could also lead to identification of goals and allowing a person to 'get on with life' in line with these goals. Risdon, Eccleston, Crombez and McCracken (2003) qualify that the term 'acceptance' can be misunderstood. Acceptance of a situation does not necessarily imply quitting or resignation, but it may require some level of exposure to reality or suffering so that unworkable strategies can be substituted with actions that allow a person to achieve their goals in life (Hayes et al., 1999a).

4.1.2 Acceptance in a therapeutic context – Acceptance and Commitment Therapy

Acceptance and the therapeutic approach generated from its empirical study – Acceptance and Commitment Therapy (ACT) – has been used in an increasing range of clinical conditions, including obsessive compulsive disorder, depression, psychosis and substance abuse (Twohig, Hayes, &

Masuda, 2006; Zettle & Raines, 1989; Bach & Hayes, 2002; Hayes, Bissett, Roget, Padilla, Kohlenberg, & Fisher, 2004).

ACT is based on the theoretical underpinnings of functional contextualism (Hayes, 1993; Hayes, Hayes, & Reese, 1988; Biglan & Hayes, 1996). In brief, contextualism requires focusing on a whole event and taking in the context and function of an event. Functional contextualism is distinctive compared with other philosophical stances due to its unique goals. Within contextualism, an act within a context cannot be explained by breaking this act down into its constituent pieces. A psychological act is viewed then as an interactive whole (Hayes, Strosahl, & Wilson, 1999). Functional Contextualism also operates on the Truth Criterion of successful working (Hayes et al, 1999). That is, what is one person's goals or context, is not another's and to assume this would go against this truth criterion and the assumptions of Functional Contextualism.

This is in direct contrast to the mechanistic philosophy that is generally adopted by the natural and psychological sciences. From a mechanistic perspective, the aim is to interpret the world and its events by analysing each of its constituent parts, the relationships between these and potential modulating factors. Implicit to a mechanistic view is that the parts,

relationships and modulating factors are predetermined and thus already exist. From this, models are developed and from this we can understand events (for instance, as they relate to each person) by interpreting them using this model. It is therefore for the mechanistic scientist to discover these pre-existing elements by adopting a reductionist approach to analysis. By contrast, Functional Contextualism does not assume that the world is pre-organised into discoverable parts (Hayes et al, 1999).

Yet, currently our empirical methods of advancing the study of ACT and its efficacy within clinical settings are based on methodologies consistent with a reductionist, mechanistic approach. For instance, we utilise questionnaire based methods to measure levels of acceptance with the assumption that this will correctly define acceptance for each individual. Indeed, as researchers and clinicians, we must always bear in mind that the methods we use to analyse each individual's acceptance and experience may be inaccurate and that by doing so, key elements of function and context for each individual may be overlooked.

ACT is also underpinned by Relational Frame Theory (Hayes, 1991; Hayes & Hayes, 1989, 1992; Hayes & Wilson, 1993; Hayes & Barnes, 1997). This theory is based on the premise that we learn to respond to events in a particular way

according to some rule and/or cue and that this 'relational frame' is governed by context. It is argued that relational frames become largely verbal and language based and that many of our private experiences such as thoughts, images, feelings, sensations, urges, memories, are verbally based. Through language we assign meaning and context to these experiences and it is this ability to assign language and symbolism that allows for self awareness, reasoning and self-actualisation. In essence, it is what makes us human.

In a positive sense, language allows us to construct models, predict and plan for the future, share knowledge, learn from the past, imagine things that have never existed and develop rules that allow us to function both individually and as a society. However, language also allows us to dwell on and 'relive' painful past events, imagine unpleasant futures, compare, judge and criticise both ourselves and others.

Therefore from a clinical perspective, it has been argued that language processes are double-edged and contribute to human suffering and psychological distress. Attempts to control, struggle, or get rid of unwanted private experiences and the failure to do so can potentially cause psychological distress. Indeed, placing considerable attention on negative thoughts, feelings or sensations in the attempt to reduce or eliminate them

has been found to increase their frequency and intensity in experimental studies on suppression (Wegner, Schneider, Carter & White, 1987; Masedo & Esteve, 2007). This is termed 'experiential avoidance' (Hayes, Strosahl & Wilson, 1999b). For instance, in anxiety disorders, it is not the anxiety itself that is the problem, but the (failed) attempts to extinguish anxiety, for instance through dissociation, withdrawal or avoidance. These attempts have wider lifestyle impacts that further serve to maintain distress.

When symbols of language (i.e. words) are merged with the events they describe and also with the individuals who have described such events this, according to acceptance theorists can lead to 'cognitive fusion'. An individual may state or think: 'I am depressed'. Hayes et al (1999) argued that this looks like a description yet 'I am depressed' is a verbal label that has been treated as personal identity, not as an emotion. If this were descriptive it would be: 'I am a person who is feeling depressed'. Hayes et al. (1999) contend further that when we think a thought we also process what the thought is actually about (e.g., something bad happening when one is in a particular situation). Over time, with cognitive fusion, thoughts themselves may produce the emotion, even without the actual 'event' occurring.

Unwanted private experiences (such as sensations, emotions, thoughts) are seen as abnormal or unhealthy, rather than as the usual processes of the mind. Here then, a model of health is that which is 'all positive', yet this may not be either reality nor indeed healthy, for example, the thought 'all of my pain is awful (cognitive fusion); I must get rid of it (experiential avoidance)' when pain can be adaptive and healthy (as discussed in Chapter 1) is likely to create suffering as it is not likely to be achievable.

ACT looks to undermine cognitive fusion and experiential avoidance by fostering a sense of acceptance towards private experiences through the use of paradox, metaphor, experiential exercises, mindfulness exercises and the identification of personal values.

4.2 Acceptance and Chronic Pain

Acceptance in chronic pain is defined as, having an active willingness to have pain present and potentially experiencing emotions and thoughts associated with it in order to remain actively involved in activities that meet personal goals (McCracken, Vowles & Eccleston, 2004a; McCracken, Carson, Eccleston & Keefe, 2004b). This is based on the clinical observation that individuals with chronic pain develop ways of responding to pain that have resulted in disengagement from important and valued aspects of their life

(McCracken & Eccleston, 2005). Fostering acceptance has the aim of reducing inflexible behaviour patterns that have become unhelpful and unworkable for the chronic pain patient (McCracken, 2005).

Within the literature, acceptance has been objectively measured using versions of the Chronic Pain Acceptance Questionnaire (CPAQ; McCracken et al., 2004b), which measures two sub constructs, pain willingness and activity engagement, in addition to acceptance as a whole. Pain willingness refers to an individual's recognition that both control of pain and avoidance of pain are methods which are often unworkable strategies in adaptation to chronic pain. Activity engagement refers to the individual's desire to pursue his or her normal life activities regardless of the chronic pain. Yet, McCracken and his colleagues have acknowledged that these two factors may not be the only facets of acceptance (McCracken et al, 2004b; McCracken, Vowles & Gauntlett-Gilbert, 2007).

There have been a number of cross-sectional studies of acceptance and functioning in patients experiencing chronic pain and other chronic conditions. These have found that greater acceptance of pain was associated with decreased pain reporting and disability, lower levels of avoidance, pain-related anxiety and depression and better work status (McCracken, 1998;

McCracken et al, 1999; Evers, Kraaimaat, van Lankveld, Jongen, Jacobs, & Bijlsma, 2001; McCracken & Eccleston, 2003; McCracken et al, 2004a, 2004b; Viane, Crombez, Eccleston, Devulder, & De Corte, 2003). This relationship was maintained despite controlling for pain intensity (McCracken, 1998). McCracken and colleagues (McCracken, Spertus, Janeck, Sinclair & Wtzel, 1999) also attempted to distinguish between individuals who were functioning well and those who were not using scores from the CPAQ. They found that pain acceptance was the most powerful predictor of whether chronic pain patients were classified as 'dysfunctional' or 'adaptive' copers, once again independently of pain intensity and also depression.

In a prospective study, McCracken and Eccleston (2005) assessed chronic pain patients at two time points; firstly at an initial 'screening' assessment and secondly on the first day of an intensive multi-disciplinary treatment programme (average 3.9 months apart). Only those who went onto this programme were included in the research, however, there were no significant differences between attenders and non-attenders, with the exception of work status (where programme attenders were more likely to be out of work due to pain than non attenders). Moderate correlations were observed between acceptance scores at both time points and measures of

psychological, social, work and physical functioning, in addition to lower medication use.

Overall these findings are, interestingly, generally consistent with similar studies of overall functioning and adjustment as a function of perceived control over pain. The research presented thus far has focused on examining the relationships between acceptance and various outcome and process variables without the explicit manipulation of an experimental treatment condition. As with control-based approaches in the preceding chapter, evaluations of the impact of acceptance based treatment approaches have also been undertaken.

Geisser (1992) conducted an acceptance based intervention and compared the outcome to that of a traditional CBT programme. Geisser found that the acceptance intervention was as effective as the cognitive-behavioural one. The latter intervention focused on acquiring more effective skills to reduce or manage pain. At three month follow-up, greater acceptance scores predicted less interference with activity levels. Of particular note was that patients' self ratings of acceptance increased for both treatments, despite the seemingly different therapeutic focus.

McCracken et al. (2004a) presented preliminary results of the effectiveness of an acceptance based treatment compared against outcome measure scores whilst waiting for the treatment programme to start. The acceptance based treatment was residential and intensive over a three to four week period. There were significant increases in measures of emotional, social and physical functioning, in addition to reduced medication use following treatment and maintained after a three month period. Furthermore, level of pain acceptance increased post treatment. However, pain ratings, depression and rest levels were higher at follow-up than immediately post treatment, although still significantly lower than at pre-treatment.

This study lacked a 'pure' comparison with those who would not receive treatment or an active treatment. There are no RCTs in this area as yet, in particular large scale comparisons between CBT and acceptance based treatments. Furthermore, there is no clear indication from the literature as to which of these two modalities would benefit which particular type of chronic pain patient. Geisser (1992) speculated that both CBT and acceptance interventions may serve to decrease behavioural avoidance and increase exposure, leading to potentially comparable decreases in psychological distress and improvements in functioning.

4.3 The acceptance and control debate in chronic pain

McCracken and colleagues (McCracken et al., 2004b) state that a control agenda could potentially be widened by incorporating acceptance so that either could be used where one may be more beneficial than the other. For some individuals with chronic pain, attempts to achieve pain control has been met with failure and, over time, the struggle to gain control over pain becomes part of the 'pain problem' itself. Similarly, it has been acknowledged that acceptance may be inappropriate in situations where pain and its impact may indeed be easy to control and also where having control over pain allows the individual to live their life in the way they wish (McCracken et al, 2004b).

'Control-based' interventions in the tradition of CBT are generally based on the view that thoughts and feelings directly influence unhelpful behaviours. Consequently, interventions in this vein attempt to change the form, frequency and situational occurrence of maladaptive thoughts and emotions (Hayes et al, 1999). Strategies for control of pain are 'taught' through cognitive-behavioural programmes, where the aim is to reduce pain (for instance through distraction techniques) or stress (for instance, through cognitive restructuring or relaxation methods). Yet, perceived control is not directly linked to specific strategies for actual control of pain. Perceived

control by the nature of its definition indicates *how much* control an individual feels they have over pain, rather than the *use of specific* control strategies as detailed above.

It is argued that acceptance based approaches focus on the user's intention to use control strategies that have ultimately failed in managing unwanted symptoms (inclusive of pain) by encouraging individuals to distance themselves from them. Hayes et al. (1999) contended that acceptance methods "may help reduce the use of reasons for behaviour and hence shift the concern from moderating thoughts and feelings to experiencing the consequences of one's actions" (p.44). This implies that by increasing acceptance, some kind of behavioural experimentation (and the experience of their consequences) can occur; behavioural experiments of course being a mainstay of traditional CBT interventions.

Hayes and colleagues (1999) examined the behavioural and subjective impact of a control-based versus acceptance-based conditions implemented during a cold pressor task. Prior to this task, participants were assigned to one of three interventions, or 'rationale' conditions: acceptance based, control based or attention focused placebo. In the acceptance based rationale, participants were taught to sit back and notice their feelings and thoughts, but not to

allow them to control their actions. In the control based rationale, participants were given guidance on techniques that could help modify and regulate the pain including controlled breathing, positive imagery and self talk and body focusing. In the attention placebo rationale, participants were given information on the nature of pain from a behavioural perspective and their own pain experiences and coping strategies were reviewed in detail. These rationales lasted for 90 minutes. Pain tolerance (length of time the hand was kept in the water) was raised most in the acceptance condition compared to the control based and placebo conditions, yet report of the perception of the pain stimulus itself did not decrease across all conditions. This is a similar finding to that of Williams et al. (2004), where pain tolerance and endurance was greater in the perceived control condition compared to an attentional condition.

McCracken et al. (2007) sought to identify the everyday behaviours that reflect an accepting response to pain. McCracken and colleagues had previously developed a measure, the Brief Pain Coping Inventory (BPCI; McCracken, Vowles & Eccleston, 2005), for this purpose. This measure included both control oriented and acceptance oriented behavioural strategies employed spontaneously (i.e. without specific professional intervention) by chronic pain patients. Additionally, McCracken et al (2007)

wished to measure whether the acceptance responses on the BPCI could predict levels of disability, distress and daily activity more effectively than control based coping responses.

Factor analysis of the BPCI revealed four factors: pain management, pain control, help seeking and activity persistence. Activity persistence was associated with better psychological and physical functioning over time whilst pain control was associated with poorer functioning. Despite this, whilst participants stated using particular strategies such as exercise and pacing, these did not correlate with measures of daily activity itself. The authors highlighted that acceptance as whole construct is more than persistence with activity suggesting that the measure may not capture all the necessary behavioural responses of acceptance. Also the measures employed relied heavily on frequency of behaviours and did not examine the circumstances where such behaviours may take place and the outcome of these. Therefore, it was presence of control behaviours, rather than the *perception* of control, that was being examined. Indeed once one explores the context and circumstances of behavioural response, perceptions may seem quite pertinent.

Both indices of higher levels of pain acceptance and perceived control over pain have been associated with physical, psychological, social and work related functioning and medication and health care use. Perceived control and acceptance have been shown to be relatively weakly correlated with pain intensity, thus higher degrees of both constructs are not likely to be due to low levels of pain (e.g. Jensen & Karoly, 1991; McCracken, 1999; McCracken & Eccleston, 2005).

Arntz and Schmidt (1989) concluded that whilst perceived control can have significant positive effects, 'the kind of control that can be acquired first requires an acceptance by the patient of having pain' (Arntz & Schmidt, 1989, p.150). Although a multitude of studies have examined a number of areas including the effect of persistent pain on functioning, the impact of perceived control over pain and the relationships between acceptance and control on adjustment, the relationship between pain acceptance and perceived control has not been tested explicitly.

4.4 Rationale for current study and Research Hypotheses

The final section of this chapter highlights the development process and rationale for the research problem investigated within the present study. Examining factors which influence better adjustment to chronic pain is

important and has been a consistent empirical focus for pain scientists. Why some people function better with chronic pain than others continues to be the subject of intense speculation and debate. Coping resources and strategies that seek to increase perceived control over pain and its effects have dominated the research literature. More recently, however, there has been both a clinical and empirical shift towards acceptance based methods in pain management.

Whilst ostensibly the perception of control and acceptance may seem theoretically distinct this has not always reflected our experience within a Clinical Psychology Pain setting. Anecdotally, it appears that those who accept that they have (and may always have) some pain are better placed to work at strategies to minimise their pain, and more importantly, the disabling consequences of their pain. Some individual patients appear to have greater willingness to be active and potentially experience an increase in pain due to their belief that they could exert some degree of control over it when it occurred.

There is evidence for the relationships between levels of acceptance and perceived control individually and adaptive functioning and psychological wellbeing. Side by side, evidence for both highlights the similarity in the

correlational evidence with relation to functioning and mood and also there is evidence for both control and acceptance based interventions with the chronic pain population. This raised the question – could this be due to a level of dependence between pain acceptance and perceived control over pain? Reviews of the literature revealed no direct examinations of the relationship between perceived control and acceptance in chronic pain. To answer this question may raise interesting clinical, theoretical and therapeutic process issues for clinical psychologists and other professionals working with chronic pain.

Thus, in the present study, a preliminary investigation was undertaken to establish whether a relationship between pain acceptance and perceived control over pain exists. To the author's knowledge this has not been explicitly investigated in the current literature and therefore this study aimed to provide pilot data in this area.

To guide the process of the study, the following experimental hypotheses are proposed. These are based on the research question and a comprehensive evaluation of the current literature:

Hypothesis 1:

Total pain acceptance will be significantly and positively correlated with perceived control over pain in a chronic pain population.

Hypothesis 2:

Pain willingness will be significantly and positively correlated with perceived control over pain in a chronic pain population.

Hypothesis 3:

Activity engagement will be significantly and positively correlated with perceived control over pain in a chronic pain population.

CHAPTER 5: METHOD

5.1 Research Design

To test the research hypotheses, the research design was quantitative and a cross-sectional survey design was adopted. Thus, all participants were subject to the same procedure. The variables under examination were total scores on self rated measures of a) belief in ability to control pain; b) perceived control; c) acceptance, in addition to subscale scores on self rated acceptance measures in d) pain willingness and e) activity engagement.

5.2 Participants

5.2.1 Number of participants

Thirty nine patients consecutively referred to a Pain Clinical Psychology Service were considered for participation in the study. Thirty six patients were approached and invited to take part by the principal investigator and asked to give their consent for their questionnaire data to be used for the purpose of research. No patients invited to take part in the research study refused to participate. A further three potential participants did not meet the study inclusion criteria: two potential participants had received a previous psychological intervention for chronic pain and one had a diagnosis of a

malignant condition. Participants were not paid for their participation. Thus, although there was no direct benefit to taking part, it was hoped that the research would contribute to a wider research base informing patient care.

5.2.2 Inclusion Criteria

The main inclusion criterion for the study was that participants were new patients referred to the Pain Clinical Psychology Service for psychological assessment and/or therapy following medical assessment and treatment by a Pain Consultant. All participants must have met defined criteria for chronic pain (IASP, 1986) and be aged between 18 and 65 years.

5.2.3 Exclusion Criteria

There were two main exclusion criteria: 1) previous psychological intervention for chronic pain; 2) diagnosis of a malignant or end stage condition.

Firstly, patients who had previously received a psychological or psycho-social intervention for chronic pain were excluded. This included input provided by the Pain Psychology Service, in addition to counselling and Cognitive Behavioural Therapy provided by other mental health or appropriately qualified professionals. This intervention must have been

directed at the management of, and/or coping with the impact of the individual's chronic pain. As part of the routine initial clinical psychology assessment patients received within the Pain Psychology service, any previous professional input would be ascertained. This would allow this criterion to be examined. This exclusion criterion was deemed important as past receipt of a psychotherapeutic approach could potentially affect the variables under investigation, namely level of acceptance and perceived control of an individual's chronic pain.

Secondly, those diagnosed with a malignant condition or illness in its end stages were excluded. Such individuals were excluded on the basis that the psychosocial impact and adjustment associated with this diagnosis may also affect the variables under investigation. This is also a consistent criterion for exclusion within the chronic pain literature.

5.2.4 Participant Characteristics and Demographic Information

All participants were asked to complete a brief set of questions related to demographics and their pain characteristics (Appendix 1). Of the 36 participants who agreed to participate in this study, 26 were female (72.2%) and 10 were male (27.8%). The mean age overall was 43.4 years (range: 28 to 66 years; sd = 11.77 years). The majority of participants were either married

(N= 13; 37.1%) or single (N=12; 34.3%). The proportion of those able to work versus unable to work was 17.6% (n=6) able and 70.6% (n=26) unable , however, it should be noted that 4 participants were retired. Participants reported that pain had been present for a mean 114 months (around 9.5 years), although there was considerable variability within the sample (range of 23 to 360 months; sd = 116.2 months). The average person treated within a specialist pain clinic averages over 85 months of pain (Flor, Fydrich & Flor, 1992). Despite being asked to report on main location of pain, just under half of participants reported pain in one location only (n=15; 46.9%). Nearly one third reported experiencing pain at two (n=10; 31.3%), or three locations (n=6; 18.8%). Only one participant reported pain in four locations. The most commonly reported pain location was the back (n=15; 25%). Pain in the chest or abdomen areas accounted for 20% (n=12), followed by legs, arms/shoulders and head/neck (each n=8; 14%). Other locations of pain included the spine and genital and/or pelvic area (n=6; 13%).

5.3 Procedure

The research protocol required the following procedural elements: identification of potential participants using a set of inclusion and exclusion criteria; invitation and recruitment to the study, which included the

obtainment of written consent and administration of outcome measures.

Each of these elements will be discussed in turn.

5.3.1 Participant Invitation

All new consecutive patients referred to a Pain Clinical Psychology Service were routinely asked to complete standardised questionnaires at their first appointment as part of a comprehensive psychological assessment. This included the outcome measures utilised within the present study. At the first appointment, potential participants who met the study inclusion criteria were approached and invited to participate in the study by the clinician (either a Consultant Clinical Psychologist or the Trainee Clinical Psychologist, who is also the principal investigator) within the Pain Clinical Psychology Service.

The assessing clinician explained the study's procedure to potential participants. This included that participation in the study would involve giving consent for questionnaire responses to be used as data to answer specific research questions that would help gain greater understanding about pain. If willing, potential participants were given the Participant Information Sheet (Appendix 2) by the clinician and were asked to read and consider this prior to their next clinic appointment. The second clinic appointment was

usually within two weeks of the initial assessment appointment. Thus, potential participants were given at least seven days to consider whether they would wish to take part in the research. Participants were invited to contact the researcher for further discussion if required. The name of a Clinical Psychologist, not otherwise involved in the study, but who had agreed to undertake this role was given should potential participants wish to discuss whether they should participate or not.

5.3.2 Procedure for Informed Consent

Those identified as potential participants and given information about the research study at the first appointment were subsequently approached by the Psychology Assistant attached to the Pain Clinical Psychology Service prior to their second appointment with their Psychologist. Any further questions regarding the research were answered and those who wished to participate were asked to complete and sign a written consent form (Appendix 2). It was felt that adopting this procedure would remove any inherent expectation for participation that may have been felt if consent was obtained by the Psychologist they were currently seeing.

5.4 Outcome Measures

5.4.1 Administration of Outcome Measures

All participants had completed a series of questionnaires prior to their first appointment with a Psychologist. The three measures completed by participants as part of this study were: the Revised Chronic Pain Acceptance Questionnaire (known as CPAQ; McCracken, Vowles, & Eccleston, 2004); Pain Control Scale from the Survey of Pain Attitudes (PCS-SOPA; Jensen et al, 1987) and the Perceived Control Likert Response Scale (Jensen et al, 1991). All participants were also asked to complete a brief series of demographic and pain-related questions. The set of questionnaires used can be referred to in Appendix 1.

These questionnaires were completed within the waiting room and given to the Psychologist for review as part of a comprehensive psychological assessment. Time taken to complete the questionnaires was between five to ten minutes. All participants completed these questionnaires on one occasion for the purpose of routine assessment; however, administration at end of psychological therapy may have been warranted for the purpose of evaluation of therapy outcome. As therapeutic outcome was not the object of the present study, any such re-administered measures were not examined.

Following completion of the standardised measures and written consent, each participant's responses were given an Identification Number (e.g., 001) to allow for anonymisation and coding for statistical analysis. This process was completed by the principal investigator.

5.4.2 Overview of Outcome Measures

A combination of standardised and non-standardised questionnaires were utilised within the study. All of these measures were self-report.

5.4.3 Revised Chronic Pain Acceptance Questionnaire (CPAQ; McCracken et al., 2004).

The Chronic Pain Acceptance Questionnaire (CPAQ) is a standardised measure of acceptance of chronic pain that yields a total score (hereafter known as Total Acceptance score), and two subscale scores for Pain Willingness and Activity Engagement. This measure consists of 20 items in total with 9 items relating to the Pain Willingness subscale and 11 items to the Activity Engagement subscale. Pain Willingness refers to the individual's recognition that both control of pain and avoidance of pain are methods which are often unworkable strategies in adaptation to chronic pain. Activity Engagement refers to the individual's desire to pursue his or her normal life activities regardless of the chronic pain.

The CPAQ items are a list of statements and individuals are instructed to rate the truth of each statement as it applies to them using a seven point response scale from 0 ("never true") to 6 ("Always true"). Items in the pain willingness subscale are reverse scored. Example items from the pain willingness sub scale include: " I would gladly sacrifice important things in my life to control this pain better"; "I avoid putting myself in situations where my pain might increase", and " My thoughts and feelings about pain must change before I can take important steps in my life". Example items from the activity engagement subscale are: " There are many activities I do when I feel pain", "Despite the pain, I am now sticking to a certain course in my life", and "It's not necessary for me to control my pain in order to handle my life well". The full measure can be viewed within Appendix 1.

The CPAQ was originally developed by Geisser (1992) using the Acceptance and Action Questionnaire (AAQ; Hayes, Strosahl, Wilson, Bissett, Pistorello, & Piasecki, 2004) – a measure of emotional avoidance – as its structural basis. This 'original' CPAQ consisted of 24 items from 34 AAQ items, which were scored to quantify an individual's acceptance of their chronic pain. The validity and reliability of this measure has been supported in a factor analysis study (McCracken et al, 2004), where a two factor structure with 20 items (reduced from 24) was supported. Thus, the two factors of Pain

Willingness and Activity Engagement remained within the Revised CPAQ, which demonstrated very good to excellent internal consistency with Cronbach alphas of .78 (pain willingness) and .82 (activity engagement). There were also moderate to high correlations with measures of emotional distress, avoidance and daily functioning, supporting the CPAQ's validity as a measure of acceptance within the chronic pain population (McCracken et al, 1998; McCracken et al, 2004).

Although a relatively new measure, early indications from the literature provide a consistent pattern of support for the reliability, validity, and practical utility of the scores derived from it. The CPAQ has been used in at least 12 published studies of chronic pain over the past nine years (McCracken et al, 2007).

5.4.4 Pain Control Scale – from the Survey of Pain Attitudes (PCS-SOPA; Jensen et al, 1987., Jensen & Karoly., 2007).

The Pain Control Scale is a 10-item scale within the Survey Of Pain Attitudes (SOPA) measuring an individual's belief in their ability to control their pain. The items in this scale consist of a series of statements for which respondents are asked to indicate their level of agreement with each. Ratings were made using a five point scale, from 0 ('very untrue') to 4 ('very true'). Items 2, 3, 5,

and 9 are reverse scored. Examples of items are: 'There are many times when I can influence the amount of pain I feel', and 'There is little that I or anyone can do to ease the pain I feel'.

The Pain Control Scale has adequate internal consistency, with Cronbach alphas of .78 (Tait & Chibnall, 1997) and .84 (Jensen et al, 1987) reported in the literature (please refer to Table 5.1). Its construct, criterion related and test-retest reliability have also been supported (Jensen et al, 1987; Jensen et al 1991; Strong, 1992). A total score is obtained by summing all individual item ratings.

5.4.5 Perception of Control Likert Response Scale Questions (Jensen et al., 1991; Rosentiel & Keefe, 1983).

This consists of 3 'Likert Scale response type' questions administered with the PCS-SOPA to assess perception of control. These questions are 1) 'how much control do you feel you have over your pain?', 2) 'how much do you feel you could decrease your pain?', and 3) 'to what extent do you feel that you have control over the effects of pain in your life?'. The last two items are contained in the Coping Strategies Questionnaire (Rosentiel & Keefe, 1983).

Within the present study, reliability analyses were conducted on the three Perception of Control Likert Response questions with a Cronbach's alpha of .91 demonstrating a high internal reliability (Nunnally, 1978).

5.4.6 Demographic and Pain Characteristic Questionnaire

A set of brief questions was also administered with the above measures was also used to obtain information about the personal characteristics of all participants (Appendix 1). This set included questions about gender, age and marital status. Questions also related to individual's pain characteristics included: main location of pain, length of pain (' how long have you experienced your pain?' in years and months) and ability to work due to pain (Are you able/unable to work due to your pain?). Inclusion of these questions is consistent with other research in this area.

5.5 Data Management and Analysis

5.5.1 Data Management

In order to undertake statistical analysis, the data were anonymised and entered into a spreadsheet database within the SPSS package (Version 14). The data was subsequently checked by hand for any omissions or errors.

5.5.2 Data Analysis

An exploratory analysis of the demographic and participant characteristic data was performed. In addition, there was a visual inspection of the distribution of the measures of perceived control, overall acceptance and its subscales (pain willingness and activity engagement) to clarify assumptions of normality, linearity and homogeneity within the data. A reliability analysis of each measure's responses was also completed and is reported in 5.53.

Bivariate correlational analyses were undertaken to examine whether significant associations (relationships) between the acceptance and perceived control variables existed. As the outcome measure data was determined to meet assumptions for parametric statistical tests, Pearson's r product moment correlations were used.

Lastly, participant data were divided into groups on the basis of higher versus lower overall perceived control score from the SOPA. Group differences in levels of pain willingness, activity engagement and total acceptance were then tested using independent t -tests.

5.5.3 Reliability analyses of outcome measures

Reliability analyses on each of the outcome measures were conducted and the results compared with previous published scores of internal consistency. The results for the Pain Control subscale of the SOPA were compared to studies investigating the reliability of the scale (Tait & Chibnail, 1997; Jensen, Turner & Romano, 2000). Internal reliability results for the Pain Control subscale of the SOPA is shown in Table 5.1. The present study has a Cronbach's alpha of .87 which is slightly higher than published results and indicates high internal consistency.

Table 5.1: Comparison of Cronbach's Coefficient Alpha of present study against prior research of reliability of the Pain Control Subscale of the SOPA.

	Present Study n=34	Tait & Chibnail, (1997) n=395	Jensen, Turner & Romano (1987) n=169
Cronbach's Coefficient Alpha	.86	.78	.84

Table 5.2: Comparison of Cronbach's Coefficient Alpha of present study against prior research of reliability of the CPAQ

CPAQ Sub-scale	Results from Present Study	McCracken et al(2004) Study
Pain Willingness	.83	.78
Activity Engagement	.79	.82

Reliability analyses for the CPAQ subscales of Pain Willingness and Activity Engagement were also conducted and compared to coefficient alphas published in previous research on this scale (e.g., McCracken et al, 2004) and shown in Table 5.2. The results of the reliability analysis gives alphas of .83 and .79, respectively, for the pain willingness and activity engagement subscales is comparable with previous research and showing a strong degree of internal reliability within this study's data.

5.5.4 Statistical Power

G Power Version 3.0.08 was used to calculate a priori sample size for bivariate correlation model at alpha level 0.05, statistical power 0.8 and with a medium effect size. This is a typical estimate for studies in the behavioural sciences in the absence of a concrete guide (Cohen, 1988). Required sample size was estimated at 64 participants. This package was also used to calculate post hoc effect size.

5.6 Ethical Considerations

5.6.1 Primary Ethical Considerations

The primary ethical issues considered in this research related to the procedures of participation and informed consent of potential participants.

Of key importance was that potential participants were not distressed or felt that the service they received would be compromised due to their participation or non-participation. Thus, the research protocol included measures to minimise the possibility of distress or address any such concerns.

First, discussion of the study was appropriately placed within the initial assessment and adequate time allocated for its discussion. Second, anonymisation of questionnaire responses was undertaken. Third, participants were given a verbal explanation – reiterated in the Participant Information Sheet – that non-participation would not compromise the treatment they received. Fourth, it was important that potential participants did not feel in any way pressured to give consent for their questionnaire responses to be used in the research.

Hence, there was a period of at least seven days between patients receiving information about the study and the giving of consent to allow patients adequate time to consider whether they wished to take part and ask questions about the study. Finally, as this research was conducted using data gathered within routine clinical practice and any perceived pressure to

participate may have had a negative impact on the therapeutic alliance, a psychology assistant obtained written consent.

5.6.2 Ethical and Local Research and Development Approval

Following discussion with Research Ethics Committee Administrative staff, an application for ethical review was made to the NHS Fife and Forth Valley Research Ethics Committee (REC). Following consideration by the REC, a favourable ethical opinion was granted (please refer to Appendix 3). REC approval was granted following minor editorial changes to the Participant Information Sheet. Management approval from the NHS Forth Valley Research and Development department was granted by the NHS Board Medical Director was then received (see Appendix 3).

CHAPTER SIX: RESULTS

6.1 Results of exploratory analyses

6.1.1 Descriptive statistics for sample

Descriptive statistics (means, range, standard deviations) for the Chronic Pain Acceptance Questionnaire (CPAQ), Pain Control Scale of the SOPA (PCS-SOPA), and the Perceived Control Likert Response Scales are presented in Table 6.1.

6.1.2 Tests of assumptions of normality

To determine whether the outcome measure data met the normality assumptions required for using parametric tests, the Kolmogorov - Smirnov test was conducted on the data from the SOPA, CPAQ and Perceived Control Likert Response scales. For all of the measures $p > 0.05$ cut off (Pallant, 2000) indicating no significant deviation from normality. Clark-Carter (2004) stated that data must deviate significantly from normal in order to warrant the use of non-parametric over parametric tests.

Levene's Test Statistic for Homogeneity of Variance was referred to during independent samples *t*-tests comparing males and females on measures of perceived control and acceptance. These indicated no significant differences

Table 6.1: Mean, standard deviation and ranges for CPAQ, PCS-SOPA, and Perceived Control Likert Response Scales (n=36)

Outcome Measure	Minimum	Maximum	Mean Score	Std. Deviation
Pain Willingness (CPAQ)	1	32	15.62	8.42
Activity Engagement (CPAQ)	12	48	28.74	9.60
Total Acceptance Score (CPAQ)	14	80	44.35	14.48
Pain Control scale of SOPA	0	30	16.44	7.93
Perceived Control Response Scale 1	0	7	2.50	1.94
Perceived Control Response Scale 2	0	6	2.26	1.76
Perceived Control Response Scale 3	0	7	2.26	2.02
Perceived Control Response Scales Total Score	0	19	7.03	5.28

Table 6.2 : Mean scores of acceptance and perceived control by gender

Outcome Measure	Mean Score Males (SD)	Mean Score Females (SD)
Pain Willingness (CPAQ)	11.60 (5.57) *	17.27 (8.6) *
Activity Engagement (CPAQ)	29.60 (9.73)	27.65 (9.78)
Total Acceptance score (CPAQ)	40.70 (8.59)	44.92 (15.94)
Pain Control scale from SOPA	12.70 (9.92)	17.23 (6.86)
Perceived Control Likert Response Scale 1	2.10 (2.08)	2.54 (1.90)
Perceived Control Likert Response Scale 2	1.80 (1.93)	2.27 (1.76)
Perceived Control Likert Response Scale 3	1.90 (2.18)	2.23 (2.21)
Total of Perceived Likert Response Scales	5.6 (5.85)	7.04 (5.25)

* significant at $p < 0.05$

in variance for all outcome measures ($p > 0.05$), except for item 1 of the Perceived Control Likert Response Scales asking how much control over their pain participants felt they had ($p = 0.001$) and their total score from these three items ($p = .012$). Thus, the unequal variance t-tests were referred to for these outcome measures.

6.1.3 Differences in perceived control and acceptance between gender

It has been noted from the literature that there may be some differences between males and females in their both their perception and response to pain (e.g., Riley, Robinson, Wise, Myers & Fillingim, 1998; Robinson, Riley & Myers, 2000; Tamres, Janicki & Helgeson, 2002) . Therefore, to establish whether this was the case here, independent *t*- tests were performed comparing males and females across measures of acceptance and perceived control. The results of these analyses are documented in Table 6.2.

Independent *t* – tests indicated that females had significantly higher pain willingness scores than males. There were no significant differences between the genders on activity engagement, total acceptance score, the Pain Control Scale of the SOPA, or the Perceived Control Likert Response Scale items.

6.1.4 Differences in pain acceptance between high and low perceived control groups

Scores on the Perceived Control Scale of the SOPA were re-categorised into two categories: those above the clinical cut-off in a chronic pain sample ('termed high perceived control') and those below the clinical cut-off ('low perceived control'). This cut-off is defined by the average score obtained by the combined chronic pain sample used in the standardisation of the SOPA (Jensen & Karoly, 2007). A raw score of greater or equal to 19 signalled a

higher degree of perceived control. A raw score lower than or equal to 18 would signal a lower degree of perceived control.

Independent samples *t* –tests were performed to compare high and low perceived control groups on pain willingness scores, activity engagement scores and total pain acceptance scores. No significant differences were found between those with higher or lower perceived control on pain willingness or activity engagement. A significant difference was found between those in higher and lower perceived control groups on the total acceptance score $t(34) = -2.329, p < 0.05$. Indeed, those in the higher perceived control group scored higher on total acceptance ($M = 49.9, SD = 13.2$) than those in the lower perceived control group ($M = 39.3, SD = 13.6$) with a mean difference of 10.6.

6.2 Total Pain Acceptance and Perceived Control over Pain

Hypothesis 1 stated that pain acceptance would be positively correlated with perceived control over pain.

To test this hypothesis, a one-tailed Pearson's product moment correlation was performed between Perceived Control scores from the SOPA, the three Perceived Control Likert Response scale scores and Total Pain Acceptance

score from the CPAQ. These coefficients are shown in Table 6.3. Perceived Control scores from the SOPA) were significantly, and moderately, positively correlated with total acceptance scores ($r = .336, p < 0.05$). Therefore, as total pain acceptance scores increased so did perceived control scores on the SOPA. However, there were no significant associations between any of the single-item Perceived Control Response Scale scores or their total score and total pain acceptance (all $p > 0.05$).

Thus, hypothesis 1 was partially supported based on the results of these analyses.

Table 6.3: Inter-correlation results of measures of perceived control (Perceived Control Scale – SOPA and Perceived Control Likert Scale Responses) and acceptance.

	CPAQ- Pain Willingness	CPAQ – Activity Engagement	CPAQ – Total Acceptance	Pain Control Scale of SOPA	Perceived Control Scale Item 1	Perceived Control Scale Item 2	Perceived Control Scale Item 3	Perceived Control Likert Scale Total
CPAQ- Pain Willingness	1	.288*	.773**	.327*	.180	.182	.075	.161
CPAQ – Activity Engagement	.288*	1	.830**	.217	.150	.050	.185	.145
CPAQ – Total Acceptance	.773**	.830**	1	.336*	.206	1.39	.169	.191
Pain Control Scale of SOPA	.327*	.217	.336*	1	.641**	.603**	.602**	.667**
Perceived Control Scale Item 1	.180	.150	.206	.641**	1	.748**	.846**	.942**
Perceived Control Scale Item 2	.182	.050	.139	.603**	.748**	1	.720**	.885*
Perceived Control Scale Item 3	.075	.185	.169	.602**	.846**	.720**	1	.602**
Perceived Control Likert Scale Total	.161	.145	.191	.667**	.942**	.885**	.935**	1

* p<0.05 ** p<0.01

6.3 Pain Willingness and Perceived Control over Pain

Hypothesis 2 stated that pain willingness would be significantly positively correlated with perceived control over pain.

To test this hypothesis, one-tailed Pearson's r correlations were conducted between pain willingness scores, total perceived control from the SOPA and the three single item Perceived Control Response scales (see Table 6.3). Total scores from the Pain Control scale of the SOPA were moderately positively correlated with pain willingness scores ($r = .337, p < 0.05$), indicating that the higher the perceived control score, the higher the pain willingness score. However, there were no significant correlations between any of the three single item measures of perceived control or their total score and pain willingness (all $p > 0.05$). Thus, hypothesis 2 is partially supported.

6.4 Activity Engagement and Perceived Control over Pain

Hypothesis 3 stated that activity engagement would be positively related to perceived control over pain.

To test this hypothesis, one-tailed Pearson's r correlations were performed on data from the Pain Control scale of the SOPA and the activity engagement sub-scale of the CPAQ (see Table 6.3). There was no significant association

between perceived control scores and activity engagement scores. Pearson's r correlations were also performed using scores from the Perceived Control Likert Response Scales (Items 1-3 and Total Score) and the activity engagement score from the CPAQ (see Table 6.3). Similarly, there was no significant association between any of the perceived control response scales or their total score and activity engagement (all $p > .05$). Thus, Hypothesis 3 was not supported.

6.5 Post hoc Power Analyses

As the number of participants that completed the outcome measures did not reach the number suggested by the power calculations (Cohen, 1992), post hoc power calculations were considered necessary to determine the level of power obtained by the study. The post hoc power analyses utilised the error probability, sample size and effect size of each correlational analysis conducted. The GPOWER online power calculator was used.

The power of a statistical test is the probability that the test will reject a false null hypothesis. Thus, statistical power is the odds of saying that there is a relationship, difference or gain when there is, in fact, one. This probability is based on the premise that if a study was replicated 100 times, the number of instances where an effect (or relationship) was shown in a statistical test. A

traditionally accepted power score is .80 (Cohen, 1992). This score represents that in 80 out of 100 replications, an effect would be shown, and represents the odds of accepting the alternative (or experimental) hypothesis. As this power score increases, the chances of a Type II error decreases. A Type II error is when the results of statistical tests are interpreted as showing no effect/relationship when in fact there is. For instance where statistical power is .80, this means that the likelihood of a Type II error is 20 times out of 100 replications. In essence, one requires as large a power score as possible for the results of each statistical test performed. A low power score casts doubt that similar effects/relationships would be found in replications of the study.

First, post hoc power for the significant associations will be presented. The results of power calculations for the significant association between the scores on the Pain Control scale from the SOPA and total pain acceptance score from the CPAQ, with a power of .68 indicating that if the present study were replicated, in 68 instances an effect would be shown. The results of the power calculation for the significant association between the Pain Control (SOPA) scores and pain willingness scores (CPAQ) was .65. This is somewhat lower than the traditionally accepted .80 (Cohen, 1992) yet in this study it was sufficient to detect significant (moderate) correlations.

It is, however, more pertinent to report the results of post hoc power calculations for the tests which were non significant. Perceived Control (as measured by the Pain Control scale of the SOPA) and activity engagement (CPAQ) scores were not significantly associated. The results of a power calculation was .37. Similarly, power calculations for the non significant associations between the Perceived Control Likert Response Scales and pain acceptance scores (pain willingness, activity engagement, and total pain acceptance) were extremely low, ranging from .09 to .34). It is likely therefore that in the present study any statistical effect shown may only be generalisable to the present sample and the likelihood of replicable results in other samples may be low.

CHAPTER 7: DISCUSSION

7.1 Discussion of Hypotheses

The main aim of the present study was to conduct a preliminary investigation into relationships between levels of perceived control and acceptance of pain in a chronic pain population referred for clinical psychology input. It was hypothesised that perceived control and pain acceptance would be positively correlated. Hence, chronic pain patients with a higher level of perceived control over pain would have a greater degree of pain acceptance and vice versa, that those with a lower level of perceived control would have a lower degree of pain acceptance. It was predicted that this would be the case for pain acceptance as a whole, in addition to the sub-constructs of pain willingness and activity engagement.

There was some support for the hypothesis that greater pain willingness and total level of pain acceptance would be associated with higher degrees of perceived control over pain, as measured by standardised rating scales of these constructs. Furthermore, exploratory analyses revealed that those with higher and lower levels of perceived control (as defined by clinical cut-off scores of the Pain Control Scale of the SOPA generated by the standardisation sample) had corresponding high and low levels of pain acceptance.

This is consistent with previous research by Jacob and colleagues, which suggested that possessing a more accepting stance towards pain could lead to a greater sense of overall self control (Jacob, Kerns, Rosenberg, & Haythornwaite, 1993). It is possible that by adopting a relative willingness to experience pain this may facilitate a stronger sense of personal control over pain. However, given the correlational nature of the study, it is impossible to determine cause and effect. Thus, it could be that having a greater perceived sense of pain control may make it possible to have greater willingness for pain.

The results would suggest that possessing pain willingness, and to a lesser extent, pain acceptance overall, does not exclude having a high level of perceived control. Masedo and Esteve (2007) argued that acceptance does not stand for replacing 'control' with 'no control'. The aim of acceptance would be to direct the target for control from those events that are uncontrollable (like the pain itself) and efforts from those which are unworkable (such as maladaptive behaviours) to controllable events and behaviours (Hayes, Strosahl & Wilson, 1999b). The focus shift towards controllability through acceptance may indeed concurrently increase an individual's sense of control over pain.

The hypothesis that activity engagement and perceived control would be positively correlated was not supported, however. Furthermore, associations between perceived control as measured by single item scales and acceptance variables were not significant. One argument could be that the non-significant results obtained in these areas may have been caused by inadequate power. Nevertheless, given that the vast majority of non-significant results did not approach statistical significance, it is likely to be inappropriate for these outcomes to be explained adequately by a lack of power. Therefore, one must speculate to some degree about alternative explanations for these findings.

It perhaps poses an interesting question about the *process* of acceptance. Specifically, is pain willingness required to be experienced before active activity engagement can be achieved? The common definition of pain acceptance the reader was introduced to in Chapter Four where acceptance in chronic pain is to have an active willingness to have pain present *in order* to remain actively involved in activities that meet personal goals (activity engagement; McCracken et al, 2004a, b), may suggest that this may be the case. Thus, one must be willing in order to engage. Of course, the potential of the influence of level of pain willingness on activity engagement may

require further investigation that is not possible within the context of the present study.

This does not, of course, give an explanation as to why there was no significant association between activity engagement and perceived control. One possible reason is that the measures of perceived control utilised in the current research may, on qualitative review of their items, have more conceptual affinity with the items of the pain willingness sub-scale of the CPAQ. The Pain Control scale of the SOPA is not intrinsically behavioural in its language and may be more aligned to the more 'cognitive' pain willingness items. Therefore, the non-significant results here may be due to the measures utilised to assess acceptance and control variables.

It was somewhat surprising that there were non-significant associations between the Perceived Control Likert Response Scale items relating to perceived control and acceptance. However, this may be due to misplaced assumptions about measurement of similar perceived control constructs. The three items used in the present study directly asked participants about the degree to which they felt they had control over pain, control to decrease their pain, and control over the effects of pain in their life. The latter two items came from the widely used Coping Strategies Questionnaire (Rosentiel &

Keefe, 1983). Previous research (Tan et al, 2002) concluded that the appraisal of pain control is multi-dimensional and that the reliance on one sole measure of perceived control would not adequately capture the entire construct. Thus, these additional measures were included as they had been used in previous research (Jensen et al, 1991; Rosentiel & Keefe, 1983) and were brief and thus could be simply administered in a busy clinic setting. Despite this it is possible that these single item scales were insufficient in this case and that a global measure such as the SOPA was superior in this respect.

The present findings are inconsistent with those of McCracken et al's (2007) study, which found a negative association between pain control and acceptance variables. McCracken et al. (2007) also found small correlations between overall activity level and the range and frequency of behaviours participants stated they used. Thus, participants claimed that they utilised certain behaviours and coping strategies yet in reality this did not match with overall levels of functioning or activity. Therefore, this suggests that reliance on one measure of 'control' (in this case, instrumental control) may not be adequate. It is important to emphasise that pain control in their study referred to overt behaviours and strategies (such as exercise, resting, medication, thought challenging) and not the perception of control which could be viewed as a more covert psychological process.

The associations between acceptance and perceived control in the current study were, at best, found to be moderate. Whilst statistical power is likely to be notable, it is possible that other psychological variables not measured within the present research design were influential, for instance self-efficacy (Bandura, 1977), locus of control and/or catastrophising, potentially as mediators

7.2 Limitations of the study

There are a number of limitations of this study. First, the size of the sample was relatively small and did not meet a priori estimates for sample size. This is partly due to the short period during which this research was undertaken. In addition, potential participants were a defined sample (referred to a pain psychology service) and as recruitment was undertaken within a very short period of time this restricted sample size. Post hoc power calculations indicated that the sample size may have contributed in part to non-significant results. Despite this, results indicated some degree of relationship between total pain acceptance, pain willingness and perceived control (as measured by the Pain Control subscale of the SOPA). The aim of the study, however, was to provide a pilot investigation of a potential relationship between these psychological constructs and the present results will require and warrant replication and further investigation.

The present study is also limited by its correlational design. Indeed, this is prevalent throughout the chronic pain literature. Whilst the results of the present study may suggest some degree of association between acceptance and perceived control in chronic pain, it does not demonstrate causality. Thus, it cannot be determined from the current research design and results whether possessing a higher or lower degree of pain acceptance or pain willingness has directly lead to, or caused a parallel level of perceived control over pain, or vice versa.

This sample had sought help from professional sources for their pain and thus may be considered to be part of a help-seeking population. A minority of all patients who are seen within the local pain clinic are referred to the pain clinical psychologist/s for a number of conceivable reasons. These may include the availability of psychology services' time necessitating referral of the more complex patients, patient and professionals' awareness of, and attitude towards, psychological approaches to chronic pain, and also whether individual patients actually require psychological input. The participants who agreed to take part also consented, by their attendance at their clinic appointment/s to see a clinical psychologist. In essence, the sample of the population is not likely to be representative of the chronic pain clinic population as a whole, particularly those who do not seek assistance

from the wider pain clinic. Also this research is limited to some degree by its reliance on data gathered at one point in time.

The choice of outcome measure should also be discussed, in particular with regards to the range and suitability of instruments. First, all of the measures were based on patient self report. The predominance of self report measures is common throughout the chronic pain literature. Exclusive use of self report allows for the potential influence of such factors as response style, external incentives, context and psychological state at the time of completion (Arntz & Schmidt, 1989).

There is little precedence for the use of observer based methods in chronic pain research outside of the recording of physiological response or endurance (i.e., in cold pressor tasks). In their study, Affleck et al. (1987) used clinician assessment of mood and adjustment to rheumatoid arthritis, however, their measure of perceived control was completed by patients. Keefe and colleagues modified a self-efficacy scale originally developed for arthritis patients for use with spouses and found a degree of consistency between patient and spousal report (Keefe, Kashikar-Zuck, Robinson, Salley, Beaupre, Caldwell, Baucom, & Haythornwaite, 1997), indicating that there may be scope for such measures in gaining a wider perspective of

psychological constructs in chronic pain. Perceived control and acceptance are intrinsically personally generated and therefore it may not be appropriate, or indeed feasible, to use other persons (e.g., health professionals, partners, or other family members) to rate an individual on these variables.

The Perceived Control Likert-type Response Scales (Jensen et al, 1991) are reflective of questions often asked within clinical practice and as a generic, rapid indicator of the level of control an individual feels they have over pain and the effect it has on their life. They have also been used in conjunction with other measures of perceived control, for instance the SOPA subscales (e.g., Jensen et al, 1991, 2001). For these reasons, participant responses to these scale questions were included in the present analyses. In retrospect, the use of single items (even if they originate from standardised questionnaires yet when used individually may reduce their validity) in the testing of the experimental hypotheses may not have been wise and perhaps their inclusion added little to the overall information available. They are, however, ecologically valid within a clinical setting.

It has been acknowledged that the construct of acceptance itself may extend beyond that of the two factors within the CPAQ; pain willingness and

activity engagement (McCracken et al, 2007). It may have been useful to have included an additional measure of acceptance, for instance the Acceptance and Action Questionnaire (Hayes et al, 2004), which extends the reference to acceptance beyond that of pain.

Following on from this, the present research did not include self efficacy or locus of control, which may have been pertinent given the relevance of these concepts to that of perceived control over pain. Ashgari and Nicholas (2006) included the Pain Locus of Control Questionnaire (Main & Waddell, 1991) in their study on the impact of personality and pain related beliefs. This measure has two scales: the Pain Control scale and Pain Responsibility scale. The former appears to be similar to the control scale used in the present study however, the latter adds the degree to which the individual feels responsible for the management of their pain.

Affect, and in particular, depression and pain related anxiety cannot be excluded as a confounding variable as measures of these could not be included in the present study design. This was due to a range of measures being used within the pain psychology clinic during the time period the study was conducted. For instance, the Hospital and Depression Scale (HADS; Snaith & Zigmond 1979) , Beck Depression Scale (Beck, Ward,

Mendelson, Mock, & Erbaugh, 1961) and Pain Anxiety Symptoms Scale (e.g., PASS; McCracken, Zaylen & Gross, 1992) are utilised but not all participants completed one consistent measure. The existing literature has already found significant relationships between perceived control and acceptance on psychological functioning and this may have provided a wider scope for comparison with other research findings.

7.3 Strengths of the study

Despite the above limitations, there are a number of strengths of the present study. It is, to the author's knowledge, the first empirical study of perceived control in relation to pain acceptance. There has been some recent work on pain control behaviours and pain acceptance (e.g., McCracken et al, 2007) but none that have looked at acceptance in relation to the perception of control. It has provided important preliminary data in this area for future research.

In addition, the present study utilised two standardised measures, the Chronic Pain Acceptance Questionnaire and the Pain Control scale of the Survey of Pain Attitudes. These instruments have been extensively used and validated with a chronic pain population and also within the chronic pain literature and empirical investigations of acceptance and perceived control. This is important as this allows the results of the present study to be

compared with existing findings and replicated in future explorations of these two variables.

The present study also drew on a heterogeneous sample of chronic pain conditions. A considerable amount of research within the existing evidence base has studied psychological variables with a defined chronic pain population, for example, chronic low back pain, headache, rheumatoid arthritis, or facial pain. More recently, and certainly noticeable within the acceptance literature, is the move towards examining chronic pain patients as a group without exclusion of particular sites or health conditions. The only consistent excluding factor here is that of pain related to a malignant or end stage condition. This approach reflects the observed (psychological) similarities within the chronic pain population as a whole and enables the further refinement of psychological theories of chronic pain. In turn, this allows clinicians to develop bio-psycho-social interventions that can be applied successfully with a wide range of patients experiencing chronic pain regardless of the region of pain.

7.4 Clinical Implications

The present findings lend some preliminary support to clinical observations that levels of pain acceptance and perceived control co-exist and this has potential implications for clinical work with the chronic pain population.

Specifically, the results of this study may offer some explanation as to the equivalent efficacy rates for control-based (or traditional cognitive behavioural) and acceptance-based approaches. It is possible that existing psycho-social interventions that aim to increase control in some regard, whether this is instrumental and/or perceived, may also foster pain acceptance in some patients. Similarly, current acceptance-based therapeutic approaches for chronic pain may inadvertently increased level of perceived control by increasing an individual's willingness to experience pain. Indeed, Geisser (1992) found that level of pain acceptance increased following a control based intervention. It is suggested here that this is potentially due to both psychological constructs sharing a degree of dependence, in varying degrees, in individuals who have chronic pain. However, there are no published direct comparisons between CBT and Acceptance based interventions (e.g., ACT) which could determine their relative efficacy.

Shifting efforts towards workability are not likely to be exclusive to an acceptance based approach and it can also be a target in more traditional cognitive- behavioural interventions. For instance, perceived control is promoted by reducing the impact of other cognitive variables or biases, such as catastrophising. The process of psychological education and information giving about pain that is often a significant component of psychological interventions may serve to promote both acceptance and a perception of control. There may be more than one route through clinical intervention to acceptance of pain and the benefits in physical and psycho-social functioning it entails.

The present results also imply that it may be important for clinical psychologists and others within the multidisciplinary pain team to identify an individual's level of perceived control and acceptance, in addition to other pain beliefs and coping strategies as part of a comprehensive assessment. Ascertaining an individual's level of perceived control in addition to his or her level of acceptance is likely to aid the clinician in the formulation of cases of chronic pain and detect more effectively the target for any control attempts during therapy. It would be interesting for future research to ascertain whether therapeutic targets need to be different for an individual with a higher level of perceived control and/or pain willingness than an

individual who possesses lower levels. For instance, it may be more feasible to focus on building on current strategies and fostering activities based on individual values and life goals earlier in the treatment process for those with higher levels of perceived control and pain willingness. On the other hand, it may be more productive for clinical psychologists to help their chronic pain patients focus on increasing perceptions of control and/or acceptance where these are identified as being low.

7.5 Theoretical Implications

The present findings lend support to the argument that the relationship between acceptance and control of chronic pain may possibly be a complex one (McCracken & Eccleston, 2003). There is considerable support for the role of adjustment in chronic pain and a variety of psychological factors have been shown to influence the adjustment process. Yet, the underlying processes in psychological theories of the initiation of chronic pain are poorly understood, perhaps due to a heavy use of correlational designs. The current literature in this area tells us that the possession of acceptance and/or perceived control facilitates improved physical and psychological functioning in individuals with chronic pain, still it does not tell us how, or under what circumstances this takes place.

The present findings also suggest that reliance on behavioural indicators of pain control may be premature in explaining the benefits of fostering acceptance over pain control and that cognitive processes may also be important. One possibility is that self-efficacy plays an important role. The recent influential fear-avoidance model of pain (e.g., Vlaeyen & Linton, 2000) has omitted the concept of self efficacy in chronic pain. Stress-diathesis models have incorporated self efficacy as a potential modulating factor for the development of chronic pain. There is some evidence that self efficacy may be as important as fear-avoidance beliefs, like catastrophising and fear of movement/re-injury, in predicting disability from pain (Denison, Asenlof, & Lindberg, 2004; Woby, Watson, Roach, & Urmston, 2004). Furthermore, Salomons and colleagues (Salomons, Johnston, Backonja, & Davidson, 2004) found that self efficacy may act through perceived controllability. They found that perceived control modulates the neural response to pain through cortical regions consistently linked with the processing of pain, namely the insular, anterior cingulate and secondary somatosensory cortices, a process which would be consistent with Gate Control Theory (Melzack & Wall, 1965). The findings of the present study lend support to Cook et al's (2006) argument that the role of variables such as self efficacy and perceived control should be evaluated within existing biopsychosocial models of chronic pain, rather than doing so in isolation. Up to the present date, these process

variables have been evaluated to a degree in isolation from one another, and predominantly against outcome variables, such as functioning and mood.

The present findings indicate that indices of control (in particular perceived control) may not be as theoretically distinct from those of pain acceptance. As an appraisal, perceived control may be influential in promoting willingness to have pain and the other private experiences that follow as part of acceptance. Similarly, pain willingness and acceptance may influence the perception of control.

As Arntz and Schmidt (1989) remarked, potentially for individuals to feel they have control over pain and the effects it can have on their lives, there requires a level of acceptance by the individual. Thus, to have one is to require the possession of the other, which the results of this study go some way to demonstrating.

7.6 Suggestions for future research

The current results leave several areas for further research.

Turk and Okifuji (2002) highlighted that the evidence base for the role of psychological variables in chronic pain has the tendency to over-generalise findings that are based solely on studies within specialist pain clinics.

Indeed, most of what we know about chronic pain is based on those who seek such help. Little attention has been paid to those who recover spontaneously or who make the necessary adjustments regardless of the potential limitations of whatever pain related condition they may have. The research in this area, including the current study, cannot be assumed to generalise to all individuals with chronic pain for these reasons. Therefore, studies with participants drawn from community or primary care sites are required. Future investigations in this area could draw from individuals in the acute and/or sub acute pain classifications.

As such, there is a serious need for the research agenda in chronic pain to move from single time point research to longitudinal research in order to clarify the underlying psychological processes that lead to the development of chronic pain. This should include those wider pain populations described above, but also those individuals in the earlier time line of chronic pain.

Mean pain duration of those included within the chronic pain literature is often in multiple years (e.g., seven years in Flor et al, 1992). In the current study, the range of pain duration went from two years to over twenty five years, with a mean of around ten years. There is a considerable amount of variability in pain duration within the literature and it would be of interest to explore this within longitudinal designs.

One method of investigating underlying psychological processes in chronic pain, including acceptance and perceived control, is to do so within the context of studies evaluating the efficacy of psychological interventions. Standard cognitive-behavioural treatments for chronic pain have a strong evidence base yet it has been acknowledged that not all individuals will benefit from this approach and indeed attempts to control pain may be detrimental to those for whom this cannot be achieved and control becomes part of the 'problem. Thus, acceptance based approaches have been developed and remain in their early stages. Indeed most of the work evaluating acceptance interventions for chronic pain has been conducted in one site (e.g., McCracken & Eccleston, 2005) and reproduction of these results in other clinic settings is required.

Directly comparing CBT and ACT interventions, not just in relation to clinical outcomes such as pain severity, physical, social and psychological functioning in addition to medication and health care use, and work function offers a real opportunity to measure the impact of these interventions on factors such as perceived control, acceptance, self efficacy and quality of life. Efficacy studies have tended to survey constructs that bear a direct relation to the intervention itself, i.e., measuring changes in control within control

based interventions and acceptance in acceptance based interventions. The findings of the present study suggest that measurement requires extension to identify modulating factors. This will be important in ascertaining what type of psycho-social intervention works best for whom (Roth & Fonagy, 1997; Vlaeyen & Morley, 2005).

It is important to remember that the relationships indicated within the current findings may be reciprocal. Future research is needed to more closely evaluate cause-effect mechanisms between perceived control and acceptance variables. Further emphasis on longitudinal and intervention comparison research may help to answer the question raised earlier in this discussion – whether one psychological process (acceptance and/or pain willingness, or perceived control over pain) needs to be established before the other.

As highlighted during the discussion of the present hypotheses, there potentially requires further investigation into the process of acceptance and how pain willingness and activity engagement relate to one another and whether other psychological processes or determinants of acceptance are involved in this. Self efficacy has been established as a potential moderating variable in perceived control, yet it is unclear whether this may be the case for acceptance. Perceived control and its relationship to other pain related

appraisals, in particular, catastrophising has not been investigated. Increased perceived control, alongside decreases in catastrophising and the belief that one is disabled by pain were found as a result of multidisciplinary treatment (Jensen et al., 2001). Furthermore, it is potentially of interest within the context of the current findings to consider interactions between perceived control and acceptance variables and overall functioning, as there is strong evidence that both influence the latter. Research that explores interactions between a number of psychological variables may help in developing a comprehensive bio-psycho-social model of chronic pain that includes recent work such as acceptance processes.

As the present study aimed to be a preliminary study providing pilot data for future research, replication of this study within the wider chronic pain population, would be advised.

7.7 Conclusions

The present study aimed to establish whether a relationship between perceived control over pain and acceptance existed within a chronic pain population. It utilised a sample of participants referred to a pain psychology service with the intention of providing a preliminary study of the associations of these variables. A moderate relationship was found between

perceived control and both pain willingness and overall level of pain acceptance and perceived control, but no similar association was found between perceived control and activity engagement. Exploratory analyses found that those individuals with higher perceived control had high levels of pain acceptance and pain willingness than those individuals with low perceived control. This result provides preliminary support for the co-existence of two variables previously thought to be theoretically distinct. This has important clinical implications as the existing evidence base demonstrates that both cognitive behavioural and acceptance based interventions for chronic pain are effective. This may be due to such interventions fostering increases in both perceived control and acceptance. The present findings require larger scale replication and extension into wider chronic pain populations. In addition, investigations of the relationships between these psychological variables both before and after interventions will hopefully assist in the increased knowledge of the underlying psychological processes indicated in chronic pain theories.

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APPENDICES

APPENDIX 1: Participant Information Sheet and Consent Form

INFORMATION SHEET FOR:

UNDERSTANDING PAIN STUDY

Phone: 01324 614347
Email: gillian.macleod@fvpc.scot.nhs.uk

Invitation paragraph

You are being invited to take part in a research study. It is important for you to understand why the research is being done and what it will involve before you decide whether to take part. Please take time to read the following information carefully. Please ask if there is anything you are not clear about, and feel free to talk about it with family and friends.

What is the purpose of the study?

We want to learn more about the different feelings people have about their pain. A better understanding of this will help psychologists find better ways to help people who have chronic pain.

Why have I been invited?

Everybody coming to see the psychologist about their pain at this hospital is being asked to take part. We intend to interview about 30 people.

Do I have to take part?

It is up to you to decide whether you want to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form to show you have agreed to take part. If you decide to take part you are free to withdraw at any time and without giving a reason. This will not affect the standard of care you receive.

Who is involved with the study?

Gill MacLeod who is the Clinical Psychologist for pain at this hospital. Donna Gilroy, Trainee Clinical Psychologist, who is attached to the pain clinic and is completing this research as part of a Doctorate in Clinical Psychology at the University of Edinburgh.

What is involved for me if I take part?

If you agree to take part, you will be asked to consent to the researchers obtaining details from two questionnaires on pain control and acceptance of pain that are/were completed as part of your usual care and kept with your medical records.

Who will have access to the information that I provide?

The information collected about you in this study will be anonymised i.e. linked to a special code that is stored separately on a password-protected computer file. Your identity will only be known to the members of the research team. All information obtained in the study will be stored securely in the Adult Clinical Psychology Department for 5 years.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethic Committee to protect your safety, rights, well-being and dignity. This study has been reviewed and given favourable opinion by Fife and Forth Valley Research Ethics Committee.

Who to contact for further information

Please feel free to ask Donna or Gill any questions at all about this study at any time. A brief summary of the overall results will be made available by the summer of 2008. You are very welcome to contact Donna or Gill to obtain a copy at this time.

If you would like impartial advice about whether to take part from a clinical psychologist who is not involved with this study you may contact Shirley Anderson, (Tel:01324 614387).

Thank you for your time and consideration

Centre Number:
Study Number:
Patient identification number for this study:



CONSENT FORM

Title of Project: Understanding pain study

Name of Researcher: Donna Gilroy

Contact details
Phone: 01324 614347
Email: donnagilroy@nhs.net
gillian.macleod@fvpc.scot.nhs.uk

**Please initial
each box:**

1. I confirm that I have read and understand the information sheet dated October 2007 (version 2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected.

☐

3. I agree to take part in the above study.

☐

Name of Patient

Date

Signature

Name of person taking consent

Date

Signature

When completed, 1 for patient; 1 for researcher site file, 1 (original) to be kept in medical notes

APPENDIX 2: Questionnaires and Measures utilised in the present research:

- Revised Chronic Pain Acceptance Questionnaire (CPAQ)
- Pain Control subscale from the Survey of Pain Attitudes (PCS-SOPA)
- Perception of Control Likert Response Scale Items
- Participant demographic and pain characteristics questionnaire

CPAQ

Directions: Below you will find a list of statements. Please rate the truth of each statement as it applies to you by circling a number. Use the following rating scale to make your choices. For instance, if you believe a statement is "Always True", you would circle the 6 next to that statement.

0 Never True	1 Very Rarely True	2 Seldom True	3 Sometimes True	4 Often True	5 Almost Always True	6 Always True
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1. I am getting on with the business of living no matter what my level of pain is	0	1	2	3	4	5	6
2. My life is going well, even though I have chronic pain	0	1	2	3	4	5	6
3. It's O.K. to experience pain	0	1	2	3	4	5	6
4. I would gladly sacrifice important things in my life to control this pain better	0	1	2	3	4	5	6
5. It's not necessary for me to control my pain in order to handle my life well	0	1	2	3	4	5	6
6. Although things have changed, I am living a normal life despite my chronic pain	0	1	2	3	4	5	6
7. I need to concentrate on getting rid of my pain	0	1	2	3	4	5	6
8. There are many activities I do when I feel pain	0	1	2	3	4	5	6
9. I lead a full life even though I have chronic pain	0	1	2	3	4	5	6
10. Controlling pain is less important than other goals in my life	0	1	2	3	4	5	6

0 Never True	1 Very Rarely True	2 Seldom True	3 Sometimes True	4 Often True	5 Almost Always True	6 Always True
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11. My thoughts and feelings about pain must change before I can take important steps in my life	0	1	2	3	4	5	6
12. Despite the pain, I am now sticking to a certain course in my life	0	1	2	3	4	5	6
13. Keeping my pain level under control takes first priority whenever I am doing something	0	1	2	3	4	5	6
14. Before I can make any serious plans, I have to get some control over my pain	0	1	2	3	4	5	6
15. When my pain increases, I can still take care of my responsibilities	0	1	2	3	4	5	6
16. I will have better control over my life if I can control my negative thoughts about pain	0	1	2	3	4	5	6
17. I avoid putting myself in situations where pain might increase	0	1	2	3	4	5	6
18. My worries and fears about what pain will do to me are true	0	1	2	3	4	5	6
19. It's a relief to realize that I don't have to change my pain to get on with my life	0	1	2	3	4	5	6
20. I have to struggle to do things when I have pain	0	1	2	3	4	5	6

SOPA - Control subscale*

Instructions: Please indicate how much you agree with each of the following statements about your pain problem by using the following scale:

0= This is very untrue of me
1= This is somewhat untrue of me
2= This is neither true nor untrue for me (or it does not apply to me)
3= This is somewhat true of me
4= This is very true of me

1. There are many times when I can influence the amount of pain I feel.	0	1	2	3	4
2. The amount of pain I feel is completely out of my control.	4	3	2	1	0
3. There is little I or anyone can do to ease the pain I feel	4	3	2	1	0
4. Just by concentrating or relaxing, I can 'take the edge' off my pain.	0	1	2	3	4
5. I am unable to control a significant amount of pain.	4	3	2	1	0
6. I believe that I can control how much pain I feel by changing my thoughts.	0	1	2	3	4
7. I have learned to control my pain.	0	1	2	3	4
8. I know for sure I can learn to manage my pain.	0	1	2	3	4
9. I am not in control of my pain.	4	3	2	1	0
10. I have noticed that if I can change my emotions, I can influence my pain.	0	1	2	3	4

*from the SOPA, copyright 1991, Mark P Jensen and Paul Karoly.

Perceived Control Likert Response Scale Items

On a scale of 1-7 where 0 = none and 7 = very much:

- 1) How much control do you feel you have over your pain? _____
- 2) How much do you feel you can decrease your pain? _____
- 3) How much control do you believe you have over the effect of pain on your life? _____

Participant Demographics and Pain Characteristics Questionnaire

Gender (please circle): Male Female

Age: _____ years

Marital Status(please circle): MARRIED DIVORCED SEPARATED
 WIDOWED SINGLE

Main Location of Pain _____

Are you able/unable to work at present because of your pain? (please circle)

ABLE	UNABLE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
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9	9
10	10
11	11
12	12
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97	97
98	98
99	99
100	100

How long have you experienced your pain? ____years ____months

APPENDIX 3: ETHICS AND RESEARCH & DEVELOPMENT APPROVAL FOR STUDY

- Letter of Approval from Local Research Ethics Committee
- Letter of Approval from Local Research and Development Office



Fife



Forth Valley



Tayside

Fife, Forth Valley & Tayside Research Ethics Service

Fife & Forth Valley Research Ethics Committee
Research Ethics Office
Level 9
Ninewells Hospital & Medical School
DUNDEE
DD1 9SY

logist
vice

Date:
Your Ref:
Our Ref:
Enquiries to:
Extension:
Direct Line:
Email:

22 November 2007

FB/RH/07/S0501/67
Miss Fiona Bain
Ninewells extension 32701
01382 632701
fionabain@nhs.net

Full title of study: Levels of acceptance and perceived control in a chronic pain population: a pilot study
REC reference number: 07/S0501/67

Thank you for your letter of 24 October 2007, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

The Committee wishes to clarify what is required from the sponsor when they sign the **Declaration by the sponsor's representative** (page 39-2): by ticking the boxes and signing the statement the sponsor has then confirmed that what the statements say, i.e. the boxes that have been ticked have been checked and are agreed by the sponsor. As the boxes are not ticked it is not clear what the sponsor is agreeing to.

Ethical review of research sites

The favourable opinion applies to the research sites listed on the attached form.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application	5.4	07 August 2007
Investigator CV		31 July 2007
Protocol	1	07 August 2007

Document	Version	Date
Protocol	3	24 October 2007
Covering Letter	1	07 August 2007
Letter from Sponsor		31 July 2007
Questionnaire: CPAQ	1	07 August 2007
Questionnaire: SOPA - Control Subscale	1	07 August 2007
Participant Information Sheet	1	07 August 2007
Participant Information Sheet	2	24 October 2007
Participant Consent Form	1	07 August 2007
Response to Request for Further Information		24 October 2007

R&D approval

All researchers and research collaborators who will be participating in the research at NHS sites should apply for R&D approval from the relevant care organisation, if they have not yet done so. R&D approval is required, whether or not the study is exempt from SSA. You should advise researchers and local collaborators accordingly.

Guidance on applying for R&D approval is available from <http://www.rdforum.nhs.uk/rdform.htm>.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

Here you will find links to the following

- Providing feedback. You are invited to give your view of the service that you have received from the National Research Ethics Service on the application procedure. If you wish to make your views known please use the feedback form available on the website.
- Progress Reports. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
- Safety Reports. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
- Amendments. Please refer to the attached Standard conditions of approval by Research Ethics Committees.
- End of Study/Project. Please refer to the attached Standard conditions of approval by Research Ethics Committees.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nationalres.org.uk.

07/S0501/67

Please quote this number on all correspondence

Yours sincerely

Mr Gavin Costa
Chair

Enclosures: Standard approval conditions (SL-AC2)
Site approval form

21 JAN 2008

Medical Directorate

Carseview House
Castle Business Park
Stirling
FK9 4SW



Telephone (01786) 447488
Fax
www.show.scot.nhs.uk/nhsfv

Date: 16 January 2008
Your Ref:
Our Ref: GD/ig
Enquiries to: Irene Graham
Direct Line: (01786) 457293
Fax:
Email: Irene.Graham@nhs.net

Following approval from the Fife Forth Valley Research Ethics Committee on 22 November 2007 I am pleased to confirm that I formally gave Management approval to 'Levels of acceptance and perceived control in a chronic pain population: a pilot study' on 16 January 2008.

The Research Governance Framework for Health and Community Care applies to all research undertaken within NHS Forth Valley. The Framework sets out standards and details the key responsibilities of key individuals, including the research sponsor, principle investigator, other researchers and supervisors of students undertaking research.

All those involved in the project will be required to work within accepted guidelines of research governance and IHC-GCP guidelines.

A copy of the Framework and links to background annex material can be accessed via the Chief Scientist Office website at <http://www.show.scot.nhs.uk/cso/ResGov/ResGov.htm> and ICH-GEP guidelines may be found at <http://www.ich.org/pdf/ICH/eb.pdf>

You will be required to provide a progress report on your study at the end of the study. We will also require a copy of the final report, when available. You will also be asked annually to complete a form on the activity taking place in relation to the study within Forth Valley, for each financial year during which it is active here. The appropriate forms will be provided to you by the Research and Development office when they are needed.

Yours sincerely

Gareth Davies
Medical Director

Chairman Ian Mullen BSc MRPharmS DL
Chief Executive Fiona Mackenzie MA(hons) MBA MIHM dipHSM

Forth Valley NHS Board is the common name of Forth Valley Health Board